

PUBLIC

OFFICE OF CONSUMER ADVOCATE

DIRECT WORKPAPERS

OF

MARCOS MUNOZ

**IN RE: LIBERTY UTILITIES (MIDSTATES NATURAL
GAS) CORP. d/b/a LIBERTY UTILITIES**

DOCKET NO. RPU-2016-0003

November 7, 2016

**Iowa Office of Consumer Advocate
Index of Direct Workpapers of Marcos Munoz. Pdf
RPU-2016-0003**

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : August 10, 2016
DOCKET NO. : RPU-2016-0003
COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities.
WITNESS : Keith Magee
SUBJECT : Capital Structure

2. Please provide a complete corporate organizational chart that includes all companies with which Liberty Utilities (Midstates Natural Gas) Corp. is affiliated and their relationships with Algonquin Power & Light Utilities Corporation.

RESPONSE:

Please find attached the organizational chart for Algonquin Power & Utilities Corp (“APUC”) in file RPU-2016-0003 DR 2 – Organization Chart.pdf.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : August 10, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities.

WITNESS : Keith Magee

SUBJECT : Capital Structure

3. Provide the stand-alone monthly capital structure balances of Liberty Utilities (Midstates Natural Gas) Corp. for the period December 2014 through the most recently available month. In your response, please include the following:
- a) All balances of long-term debt, separately identified by each long-term debt issue,
 - b) the interest rate, (work papers provided in IL for D-2 or D-3)
 - c) unamortized debt discount, (no debt discount)
 - d) unamortized debt expense, (clarify...is this supposed to be debt issuance costs?)
 - e) the associated amortization of the discount and expense, and
 - f) the common equity balances separately identified by each composition of common equity.

RESPONSE:

Please see the LU Midstates Capital Structure.xls file for monthly capital structure balances of Liberty Utilities (Midstates Natural Gas) Corp for December 2014 – June 2016.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : August 10, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities.

WITNESS : Keith Magee

SUBJECT : Capital Structure

4. Provide the stand-alone monthly capital structure balances of Liberty Energy Utilities for the period December 2014 through the most recently available month. In your response, please include the following:
- a) All balances of long-term debt, separately identified by each long-term debt issue,
 - b) the interest rate,
 - c) unamortized debt discount,
 - d) unamortized debt expense,
 - e) the associated amortization of the discount and expense, and
 - f) the common equity balances separately identified by each composition of common equity.

RESPONSE:

As shown in the organization chart for Algonquin Power & Utilities Corp (“APUC”), provided in response to DR #2, there is no “Liberty Energy Utilities” entity in the organizational hierarchy from APUC to Liberty Utilities (Midstates Natural Gas) Corp.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : August 10, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities.

WITNESS : Keith Magee

SUBJECT : Capital Structure

5. Provide the stand-alone monthly capital structure balances Liberty Utilities Corp., for the period December 2014 through the most recently available month. In your response, please include the following:
- a) All balances of long-term debt, separately identified by each long-term debt issue,
 - b) the interest rate,
 - c) unamortized debt discount,
 - d) unamortized debt expense,
 - e) the associated amortization of the discount and expense, and
 - f) the common equity balances separately identified by each composition of common equity.

RESPONSE:

Please see the LUCo Capital Structure - Confidential.xls file for monthly capital structure balances of Liberty Utilities Company (LUCo.) for December 2014 – March 2016.

Note, the data provided in the attached LUCo Capital Structure - Confidential.xls file supersede the data originally used by Mr. Magee to calculate LUCo's capital structure as reported in Magee Direct Exhibit KM-2, Schedule 12 Confidential. Updated capital structure ratios will be provided in Mr. Magee's rebuttal testimony.

Please note that this file is CONFIDENTIAL.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : August 10, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities.

WITNESS : Keith Magee

SUBJECT : Capital Structure

6. Provide the stand-alone monthly capital structure balances of Liberty Utilities Corp. (Canada), for the period December 2014 through the most recently available month. In your response, please include the following:
- a) All balances of long-term debt, separately identified by each long-term debt issue,
 - b) the interest rate,
 - c) unamortized debt discount,
 - d) unamortized debt expense,
 - e) the associated amortization of the discount and expense, and
 - f) the common equity balances separately identified by each composition of common equity.

RESPONSE:

Monthly financial statements are not produced for Liberty Utilities Canada Corp. Therefore, the Company has no information that is responsive to this data request.

In addition, debt financing for Liberty Utilities (Midstates Natural Gas) Corp. (the "Company") is provided through its parent company, LUCo. Equity financing for the Company is provided through LUCo, via the Company's ultimate parent company, APUC. Because Liberty Utilities Canada Corp provides no financing (neither debt nor equity) to the Company, the capital structure balances of Liberty Utilities Canada Corp are irrelevant. However, the Company has provided monthly capital structure balances for both LUCo and APUC.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : August 10, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities.

WITNESS : Keith Magee

SUBJECT : Capital Structure

7. Provide the stand-alone monthly capital structure balances of Algonquin Power & Light Utilities Corporation, for the period December 2014 through the most recently available month. In your response, please include the following:
- a) All balances of long-term debt, separately identified by each long-term debt issue,
 - b) the interest rate,
 - c) unamortized debt discount,
 - d) unamortized debt expense,
 - e) the associated amortization of the discount and expense, and
 - f) the common equity balances separately identified by each composition of common equity.

RESPONSE:

Please see the APUC Capital Structure.xls file for monthly capital structure balances of Algonquin Power & Utilities Corp. (APUC) for December 2014 – March 2016.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 16, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp.
d/b/a Liberty Utilities

WITNESS : Keith Magee (with information provided by John Peellegoda)

SUBJECT : Capital Structure

REFERENCE : Liberty Utilities' Responses to OCA Data Request Nos. 2–7.

17. Please explain how Liberty Utilities obtained the long-term debt and common equity that is included in Liberty's response to OCA Data Request Nos. 2–7. As part of the explanation, identify whether or not Liberty Utilities obtains capital directly from the market. If Liberty Utilities does not obtain capital directly from the market, please respond to the following:
- A. How is Liberty Utilities' actual capital structure determined? Is it based on target ratios, hypothetical ratios, or assigned ratios?
 - B. Provide copies of all documentation which sets forth the process by which Liberty Utilities obtains capital, and/or is allocated or assigned capital from LuCo.
 - C. Provide a narrative explanation of the affiliate relationship between LuCo and Liberty Utilities, including the services LuCo provides to Liberty Utilities and any charges billed to Liberty Utilities.

Response: The utility, Liberty Utilities (Midstates Natural Gas) Corp. does not obtain capital directly from the market. Liberty Utilities obtains long term debt through its financing affiliate, Liberty Utilities Co. ("LUCo"); and its equity is ultimately sourced through its publicly traded parent, Algonquin Power & Utilities Corp. ("APUC").

- A. Liberty Utilities parent company, LUCo, targets an investment grade capital structure.
- B. Liberty Utilities, the utility, does not have any documents responsive to this request, however, its parent company, LUCo, targets an investment grade capital structure.
- C. Liberty Utilities Co. ("LUCo") is the immediate parent company of Liberty Utilities (Midstates Natural Gas) Corp. d/b/a Liberty Utilities. LUCo provides financing for Liberty Utilities, including guarantees, short-term loans, and long-term capital debt financing on terms and conditions that the parties memorialize in written agreement(s). In 2015, charges approximated \$161,000.

Information for this response was provided by John Pellegoda, Senior Manager of Treasury.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 16, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp.
d/b/a Liberty Utilities

WITNESS : Keith Magee (with information provided by John Peellegoda)

SUBJECT : Capital Structure

REFERENCE : Response to Board Order Requesting Additional Information,
Request 3.

18. A. Please provide APUC's capital structure in U.S. dollars (Response to Board Order Requesting Additional Information, Request 3). Please update this information through June 2016.
- B. Please provide the interest rates/interest expense associated with APUC's long-term debt cost.
- C. Provide LuCo's capital structure updated through June 2016.

Response:

- A. Please see OCA DR 18A – APUC Capital Structure.xls, with updates through June 2016. Please note, because APUC is a Canadian company, it does not calculate equity in U.S. dollars. However, for illustrative purposes, the Company has provided a conversion of the capital structure balances from Canadian dollars to U.S. dollars.
- B. Please see OCA DR 18B – 199 26 5(5)(e)(13) Cost of Debt – APUC.xls and OCA DR 18B – 199 26.5(5)(e)(13) Unamort LT Debt Exp – APUC.xls.
- C. Please see OCA DR 18C – LUCo Capital Structure – Confidential.xls, with updates through June 2016.

Information for this response was provided by John Pellegoda, Senior Manager of Treasury.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 16, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp.
d/b/a Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Capital Structure

REFERENCE : Keith Magee Liberty IA Direct Exhibits KM-13.

19. Reconcile the interest rate/amount of interest expense used in Liberty Utilities' response to OCA Data Request No. 3 with the interest rate/expense provided by witness Magee in Magee Exhibit KM-13.

Response: The interest rates and amount of interest expense reflected in Liberty Utilities' response to OCA Data Request No. 3 (OCA DR #3) relates to the \$55,000,000 of debt for the utility, Liberty Utilities (Midstates Natural Gas) Corp. The interest rate provided by Company witness Magee in Magee Exhibit KM-3 is the calculated cost of debt for the utility's immediate parent company, LUCo. The LUCo cost of debt calculation was provided in response to the minimum filing requirement, subparagraph 26.5(5)e(13)

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee (with information provided by John Peellegoda)

SUBJECT : APUC Long Term Debt, Company's response to OCA Data Request No. 18B.

29. For each Long-Term Debt listed in lines 2 through 31, separately for each long-term debt issue, identify the following:
- A. The name of the company that issued the debt.
 - B. The name of the company where the debt is booked on that company's balance sheet.
 - C. The name of the company who services the debt.
 - D. The name of the company that guarantees the debt. If the debt is not guaranteed, please note "Not Guaranteed" in the response.
 - E. Provide copies of any and all documents which set forth, provides the underlying support for, and was relied upon to provide the responses to (A) through (D), and include a copy of the underlying note separately for each debt issuance.

Response:

- A. Please see the "Summary" tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- B. Please see the "Summary" tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- C. Please see the "Summary" tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- D. Please see the "Summary" tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- E. Please see the attached Q2 2016 financial statements for Algonquin Power & Utilities Corp. Please also see the note and purchase agreements filed pursuant to MFR 26.5(5)e(13) and attached documents.

Response provided by John Peellegoda, Senior Manager, Treasury

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : APUC Long Term Debt, Company's response to OCA Data Request No. 7.

30. Provide the unconsolidated, stand-alone capital structure for Algonquin Power (APUC), including long-term debt, preferred stock, and common equity, for the period December 2014 through the most recently available month. In your response, please include the following monthly balances:
- a) Each balance of long-term debt, separately identified by name,
 - b) the maturity date for each long-term debt issue,
 - c) the name of company which issued the debt,
 - d) the interest rate for each issue,
 - e) unamortized debt discount for each issue,
 - f) unamortized debt expense for each issue,
 - g) the associated amortization of debt discount and expense, separately for each issue,
 - h) preferred equity, separately identified by each preferred series,
 - i) the dividend rate of each preferred series,
 - j) preferred discount or premium for each series,
 - k) common equity balances separately identified by each composition of common equity.

Response:

- a) Please see the "Summary" and "APUC_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- b) Please see the "Summary" and "APUC_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- c) Please see the "Summary" and "APUC_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- d) Please see the "Summary" and "APUC_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- e) Please see the "Summary" and "Unamortized Debt Balances" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls

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- f) Please see the “Summary” and “Unamortized Debt Balances” tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- g) Please see the “Summary” and “Unamortized Debt Balances” tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- h) Please see the “Summary” tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- i) Please see the “Summary” tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- j) There was no premium or discount on the preferred share offerings.
- k) Please see the “Shrhld Eq” tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls

Response provided by John Peellegoda, Senior Manager, Treasury

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Liberty Utilities Corp. (LUCo Long Term Debt, Company's response to OCA Data Request No. 5.

31. Provide the unconsolidated, stand-alone capital structure for Liberty Utilities Corp. (LUCo), including long-term debt, preferred stock, and common equity, for the period December 2014 through the most recently available month. In your response, please include the following monthly balances:
- a) Each balance of long-term debt, separately identified by name,
 - b) the maturity date for each long-term debt issue,
 - c) the name of company which issued the debt,
 - d) the interest rate for each issue,
 - e) unamortized debt discount for each issue,
 - f) unamortized debt expense for each issue,
 - g) the associated amortization of debt discount and expense, separately for each issue,
 - h) preferred equity, separately identified by each preferred series,
 - i) the dividend rate of each preferred series,
 - j) preferred discount or premium for each series,
 - k) common equity balances separately identified by each composition of common equity.

Response:

- a) There is no long-term debt issued by way of indenture at the Liberty Utilities Co. unconsolidated level.
- b) Please see the response to OCA data request 31 (a)
- c) Please see the response to OCA data request 31 (a)
- d) Please see the response to OCA data request 31 (a)
- e) Please see the response to OCA data request 31 (a)
- f) Please see the response to OCA data request 31 (a)

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- g) Please see the response to OCA data request 31 (a)
- h) No preferred equity has been issued by Liberty Utilities Co.
- i) Please see the response to OCA data request 31 (h)
- j) Please see the response to OCA data request 31 (h)
- k) Please see the “Shrhld Eq” tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls

Response provided by John Peellegoda, Senior Manager, Treasury

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Liberty Utilities Corp. (LUCo Long Term Debt, Company's response to OCA Data Request No. 5.

32. Provide the consolidated capital structure for Liberty Utilities Corp. (LUCo), including long-term debt, preferred stock, and common equity, for the period December 2014 through the most recently available month. In your response, please include the following monthly balances:
- a) Each balance of long-term debt, separately identified by name,
 - b) the maturity date for each long-term debt issue,
 - c) the name of company which issued the debt,
 - d) the interest rate for each issue,
 - e) unamortized debt discount for each issue,
 - f) unamortized debt expense for each issue,
 - g) the associated amortization of debt discount and expense, separately for each issue,
 - h) preferred equity, separately identified by each preferred series,
 - i) the dividend rate of each preferred series,
 - j) preferred discount or premium for each series,
 - k) common equity balances separately identified by each composition of common equity.

Response:

- a) Please see the "Summary" and "LU_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- b) Please see the "Summary" and "LU_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- c) Please see the "Summary" and "LU_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- d) Please see the "Summary" and "LU_" tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls

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- e) Please see the “Summary” and “Unamortized Debt Balances” tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- f) Please see the “Summary” and “Unamortized Debt Balances” tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- g) Please see the “Summary” and “Unamortized Debt Balances” tabs of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls
- h) No preferred equity has been issued by Liberty Utilities Co.
- i) Please see the response to OCA data request 32 (h)
- j) Please see the response to OCA data request 32 (h)
- k) Please see the “Shrhld Eq” tab of OCA DR 29-32 – 199 26 5(5)(e)(13) Cost of Debt – APUC Updated.xls

Response provided by John Peellegoda, Senior Manager, Treasury

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Magee Direct Exhibit Supp KM-3, page 1 of 1.

33. Please provide the dollar amount of long-term debt and the dollar amount of common equity that corresponds to the Long-term Debt ratio of 46% and Common Equity ratio of 54% for Liberty Utilities (Midstates Natural Gas) Corp.

	Dollar Amount	Capital Structure Ratios	Cost Rate	Rate of Return
Long-Term Debt	\$_____	46.00%	4.83%	2.22%
Common Equity	\$_____	54.00%	10.25%	5.54%
Total	\$_____	100.00%		7.76%

Response:

Mr. Magee's recommended hypothetical capital structure of 54.00 percent equity and 46.00 percent debt applies to the Company's Iowa rate base of \$6,531,685. This corresponds to an equity value of \$3,527,110 and debt value of \$3,004,575.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Magee Direct Ex. 2, Schedule 12, page 1.

34. A. Please provide the dollar amount of long-term debt and dollar amount of common equity that corresponds to the Long-term Debt ratio of 46.26% and Common Equity ratio of 53.74% for Algonquin Power & Utilities Co.

	Dollar Amount	Capital Structure Ratios	Cost Rate
Long-Term Debt	\$_____	46.26%	_____%
Common Equity	\$_____	53.74%	
Total	\$_____	100.00%	

- B. Please provide the cost rate for Algonquin's long-term debt.

Response:

- A. The long-term debt and equity ratios for Algonquin Power & Utilities Company referenced in Magee Direct Ex.2, Schedule 12 were calculated from quarterly capital structure balances derived from SEC filings (Q1 2015 through Q4 2015) as reported by SNL Financial.

The average reported long-term debt balance was \$1,524,368, and the average common equity balance was \$1,773,293. Please see OCA DR-34 Attachment A for Mr. Magee's capital structure calculations for Algonquin Power & Utilities Company.

- B. As shown in the Company's response to OCA Data Request No. 18, the cost of APUC's long-term debt is 5.10%.

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**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Magee Direct Ex. 2, Schedule 12, page 1.

35. A. Please provide the dollar amount of long-term debt and dollar amount of common equity that corresponds to the Long-term Debt ratio of 43.81% and Common Equity ratio of 56.19% for Liberty Utilities Co.

	Dollar Amount	Capital Structure Ratios	Cost Rate
Long-Term Debt	\$_____	43.81%	_____%
Common Equity	\$_____	56.19%	
Total	\$_____	100.00%	

- B. Please provide the cost rate for Liberty Utilities Co.'s long-term debt.

Response:

- A. As noted in the response to OCA Data Request No. 5, the data provided in that response (the LUCo Capital Structure - Confidential.xls file) supersede the data originally used by Mr. Magee to calculate LUCo's capital structure as reported in Magee Direct Exhibit KM-2, Schedule 12 Confidential. Updated capital structure ratios will be provided in Mr. Magee's rebuttal testimony.
- B. Please see the response to OCA Data Request No. 32 for the cost rates of Liberty Utilities Co.'s long-term debt.

Please note the LUCo capital structure data provided is CONFIDENTIAL.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee (with information provided by John Peellegoda)

SUBJECT : Company's response to OCA Data Request No. 17.

36. A. Define "investment grade" and provide the criteria relied upon by LUCo to determine "investment grade".
- B. Provide the investment grade capitalization for each subsidiary of LUCo, and identify and include the dollar amount of long-term debt that is allocated, assigned, or targeted for each subsidiary company.
- C. Identify and describe the time frame relied on by LUCo to determine investment grade, and identify how often and under what conditions LUCo reassigns or reaffirms the targeted investment grade capital structure.

Response:

- A. At a consolidated corporate level, LUCo targets a capital structure that would be considered by rating agencies, such as S&P, as being investment grade, which S&P defines as a rating of BBB- or above.
- B. Please see OCA DR 36B – Capital Structure Balances CONFIDENTIAL.xls.
- C. LUCo will annually review the target capital structure for each utility, and seek the appropriate regulatory approvals to true-up the debt and equity components.

Response provided by John Peellegoda, Senior Manager, Treasury

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**OFFICE OF CONSUMER ADVOCATE
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DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee (with information provided by John Peellegoda)

SUBJECT : Company's response to OCA Data Request No. 17.

37. Please provide a list of all long-term debt issued by Liberty Utilities (MidStates). For each issuance, please provide:
- date of issuance,
 - amount of issuance,
 - interest rate,
 - maturity date, and
 - copy of debt prospectus.

Response: Liberty Utilities (Midstates Natural Gas) Corp. does not issue debt. The Company has the following long-term intercompany debt issuances:

- July 31, 2012
 - \$11,100,000
 - 3.51%
 - July 31, 2017
 - See the note and purchase agreements filed pursuant to MFR 26.5(5)e(13).
- July 31, 2012
 - \$25,600,000
 - 4.49%
 - August 1, 2022
 - See OCA DR 37 – LM First Amended and Restated Promissory Note – LUCo [REDACTED]
CONFIDENTIAL.pdf
- July 31, 2012
 - \$13,300,000
 - 4.89%
 - July 30, 2027
 - Please also see the note and purchase agreements filed pursuant to MFR 26.5(5)e(13).
- July 31, 2012
 - \$5,000,000
 - 4.89%
 - July 30, 2027
 - Please also see the note and purchase agreements filed pursuant to MFR 26.5(5)e(13).

Response provided by John Peellegoda, Senior Manager, Treasury

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016
DOCKET NO. : RPU-2016-0003
COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities
WITNESS : Keith Magee (with information provided by John Peellegoda)
SUBJECT : Company's response to OCA Data Request No. 17.

38. Please provide a list of all preferred equity issued by Liberty Utilities (MidStates). For each issuance, please provide:
- a) date of issuance,
 - b) amount of issuance,
 - c) dividend rate, and
 - d) copy of debt prospectus.

Response:

There is no preferred equity issued by Liberty Utilities (Midstates Natural Gas) Corp.

Response provided by John Peellegoda, Senior Manager, Treasury.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016

DOCKET NO. : RPU-2016-0003

COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities

WITNESS : Keith Magee

SUBJECT : Response to OCA Data Request No. 3, LU Midstates Capital Structure.xls

39. Please answer the following for each listed long-term debt issue:
- A. Describe the “Intercompany Notes Payable – Series A” of \$11.1 million:
 - 1. What is the name of the company that issued the debt?
 - 2. Who is the intercompany note payable to?
 - 3. Provide the interest rate, issuance date, maturity date, and face amount of the debt at issuance.
 - B. Describe the “Intercompany Notes Payable – Series A” of \$25.6 million:
 - 1. What is the name of the company that issued the debt?
 - 2. Who is the intercompany note payable to?
 - 3. Provide the interest rate, issuance date, maturity date, and face amount of the debt at issuance.
 - C. Describe the “Intercompany Notes Payable – Series A” of \$18.3 million:
 - 1. What is the name of the company that issued the debt?
 - 2. Who is the intercompany note payable to?
 - 3. Provide the interest rate, issuance date, maturity date, and face amount of the debt at issuance.

Response: Please see the Company’s response to OCA data request #37.

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

**OFFICE OF CONSUMER ADVOCATE
DATA REQUEST**

DATE : September 28, 2016
DOCKET NO. : RPU-2016-0003
COMPANY : Liberty Utilities (Midstates Natural Gas) Corp. d/b/a/ Liberty Utilities
WITNESS : Keith Magee
SUBJECT : Company's filing with the IUB August 26, 2016.
Filing Requirement, 26.5(5) e (3) – Revised.

40. LUCo's capital structure includes "Unsecured Notes to Related Parties" of { [REDACTED] }. Does the { [REDACTED] } include the \$55 million of MidStates' unsecured notes identified and included in response to OCA DR No. 2?

Response:
Yes.

Response provided by John Peellegoda, Senior Manager, Treasury

NOTE: In the event the response to this data request contains confidential information, do not simply mark the entire response or attached document(s) confidential. Please highlight, or otherwise identify, the specific information that is claimed to be confidential.

Chapter 2

The Long-Run Perspective

A long view of capital market history, illustrated by the 90-year period (1926–2015) examined here, uncovers the basic relationships between risk and return among the different asset classes and between nominal and real (inflation adjusted) returns. The goal of this study of asset returns is to provide a period long enough to include most or all of the major types of events that investors have experienced and may experience in the future. Such events include war and peace, growth and decline, bull and bear markets, inflation and deflation, and other less dramatic events that affect asset returns.

By studying the past, one can make inferences about the future. While the actual events that occurred during 1926–2015 will not be repeated, the event-types of that period can be expected to recur. It is sometimes said that only a few periods had unusual events, such as the stock market crash of 1929–1932 and World War II. This logic is suspicious because events that are deemed unusual happen with a certain regularity.^{2.1} Some of the most unusual events of the century – the market crash of 1987, the equally remarkable inflation of the 1970s and early 1980s, the more recent events of September 11, 2001, and most recently, the 2008–2009 financial crisis – took place over the last three decades or so. To the degree that historical event-types tend to repeat themselves, the examination of past capital market returns is likely informative about what may be expected in the future.

Stocks, Bonds, Bills, and Inflation: Historical Returns

Exhibit 2.1 depicts the growth of \$1.00 invested in large-cap stocks, small-cap stocks, long-term government bonds, Treasury bills, and a hypothetical asset returning the inflation rate over the period from the end of 1925 to the end of 2015. All results assume reinvestment of dividends on stocks, or coupons on bonds, and no taxes. Transaction costs are not included, except in the small stock index starting in 1982.

Each of the cumulative index values is initialized at \$1.00 at year-end 1925. The graph vividly illustrates that small-cap stocks and large-cap stocks were the big winners over the entire 90-year period: investments of \$1.00 in these assets would have grown to \$26,433.35 and \$5,390.43, respectively, by year-end 2015. This phenomenal growth was earned by taking substantial risk. In contrast, long-term government bonds (with an approximate 20-year maturity), which exposed the holder to much less risk, grew to only \$132.03.

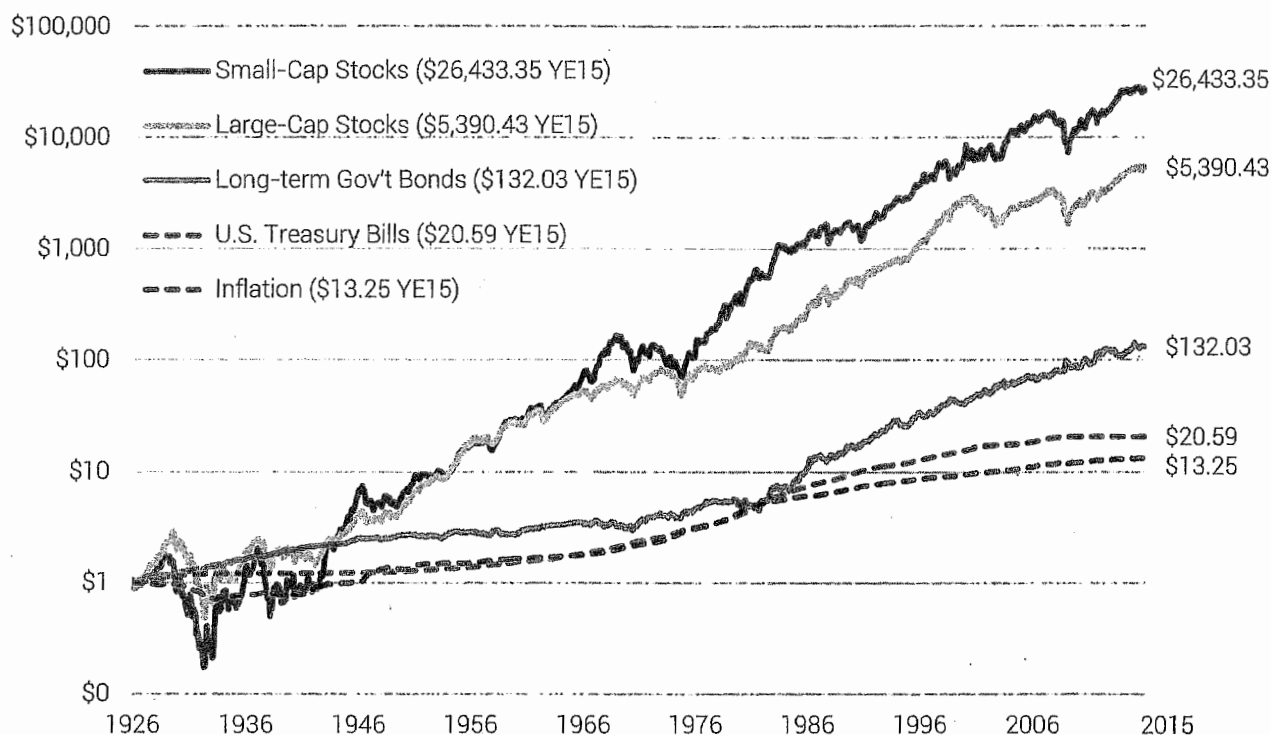
^{2.1} In 2010, Laurence B. Siegel, research director at the Research Foundation of the CFA Institute at the time, famously referred to these events as "black turkeys." The reference was to "black swans," the term author Nassim Nicholas Taleb gave to unfortunate events that aren't easily foreseeable. Siegel explained in a paper, "Black Swan or Black Turkey?" that market events like the global financial crisis are "everywhere in the data—(they) happen all the time" but investors are "willfully blind" to them. See: Laurence B. Siegel, "Black Swan or Black Turkey? The State of Economic Knowledge and the Crash of 2007–2009," *Financial Analysts Journal*, July/August 2010, Volume 66 Issue 4.

The lowest-risk strategy over the past 90 years (for those with short-term time horizons) was to buy U.S. Treasury bills. Because Treasury bills tended to track inflation, the resulting real (i.e., inflation-adjusted) returns were just above zero for the entire 1926–2015 period.

Exhibit 2.1: Wealth Indexes of Investments in the U.S. Capital Markets Index

1926–2015

(Year-end 1925 = \$1.00)



Logarithmic Scale Used on the Index Graphs

A logarithmic scale is used on the vertical axis of the index graphs presented in this book.

A logarithmic scale (see Exhibit 2.2a) allows for the direct comparison of the series' behavior at different points in time. Specifically, the use of a logarithmic scale allows the following interpretation of the data: the same vertical distance, no matter where it is measured on the graph, represents the *same* percentage change in the series. For example, on a logarithmic scale, a 50% gain from \$10 to \$15 occupies the same vertical distance as a 50% gain from \$1,000 to \$1,500. On a linear scale, the same percentage gains look different (see Exhibit 2.2b).

A logarithmic scale allows the viewer to compare investment performance across different periods; thus the viewer can concentrate on rates of return, without worrying about the number of dollars invested at any given time.

An additional (and practical) benefit of a logarithmic scale is the way the scale spreads the action out over time. It makes the graph easier to see, and makes it easier to more carefully examine the fluctuations of the individual time series in different periods.

Exhibit 2.2a: Logarithmic Scale

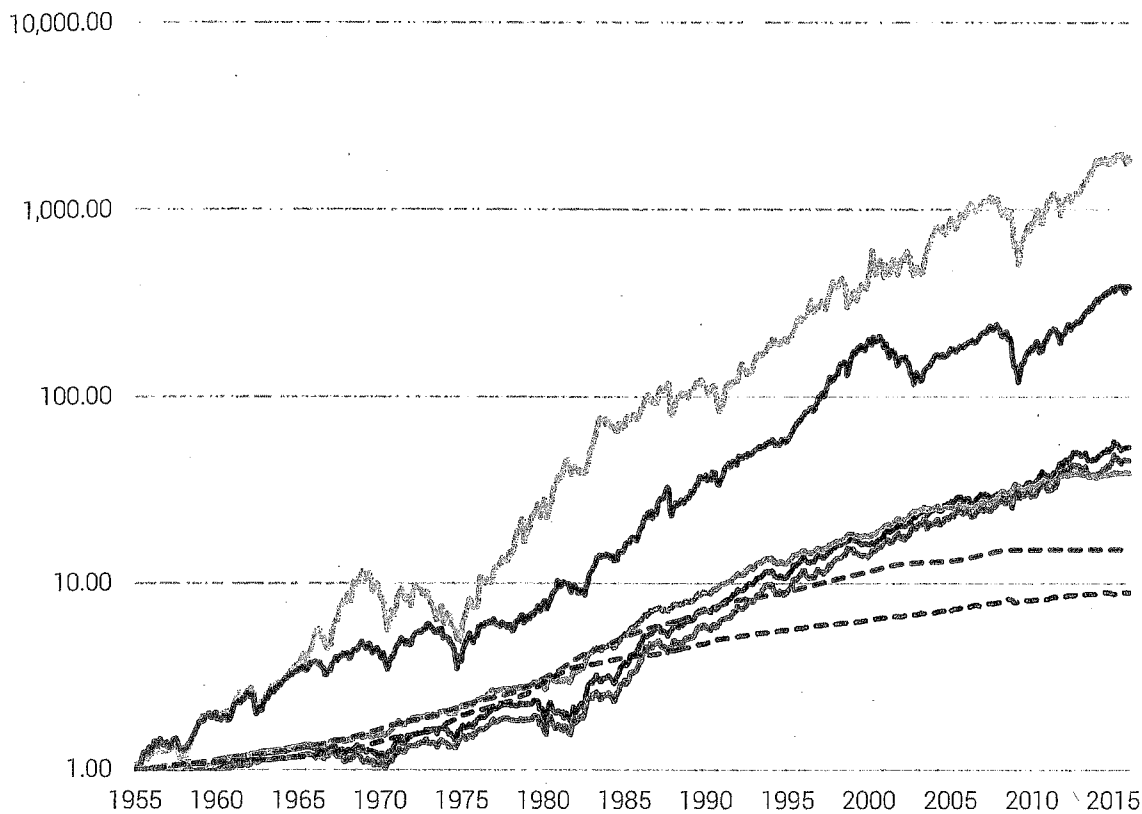
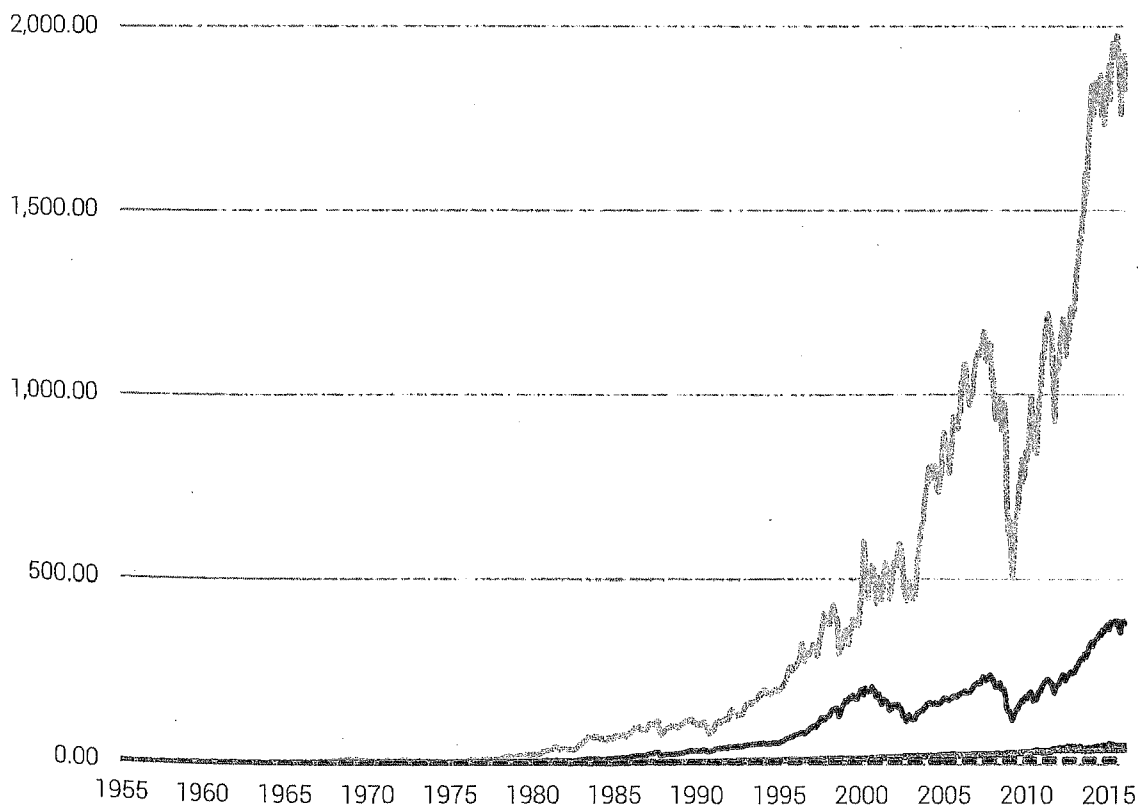


Exhibit 2.2b: Linear Scale



Large-Cap Stocks

As noted above, an index of S&P 500 total returns initialized on December 31, 1925 at \$1.00, closed 2015 at \$5,390.43, a compound annual growth rate of 10.0%. The inflation-adjusted S&P 500 total return index closed 2015 at a level of \$406.69.

Small-Cap Stocks

Over the long run, small-capitalization stock returns surpassed the S&P 500, with the small-cap stock total return index ending 2015 at a level of \$26,433.35. This represents a compound annual growth rate of 12.0%, the highest rate among the asset classes studied here.

Long-term Corporate Bonds

Long-term corporate bonds outperformed both types of government bonds over the 1926–2015 period with a compound annual growth rate of 6.0%. This higher return reflected the risk premium that investors require for investing in corporate bonds, which are subject to the risk of default. One dollar invested in the long-term corporate bond index at year-end 1925 was worth \$187.82 by the end of 2015.

Long-term Government Bonds

The long-term government bond total return index, constructed with an approximate 20-year maturity, closed 2015 at a level of \$132.03 (based on year-end 1925 equaling \$1.00). Looking at capital appreciation component alone, the \$1.00 index closed at \$1.37, a 0.4% capital gain over the 90-year period. This indicates that the majority of the positive historical returns on long-term government bonds was due to income returns. The compound annual total return for long-term government bonds was 5.6%.

Intermediate-term Government Bonds

One dollar invested in intermediate-term bonds at the end of 1925 rose to \$93.97 by year-end 2015, compared to \$92.32 at year-end 2014. The compound annual total return for intermediate-term government bonds over the 1926–2015 period was 5.2%. Capital appreciation caused \$1.00 to increase to \$1.67 over the 90-year period, representing a compound annual growth rate of 0.6%.

Treasury Bills

One dollar invested in Treasury bills at the end of 1925 was worth \$20.59 by year-end 2015, with a compound annual growth rate of 3.4%. Treasury bill returns followed distinct patterns, described in the next subsection. Moreover, Treasury bills tended to track inflation, so the average annual inflation-adjusted return on Treasury bills (or real riskless rate of return) was only 0.5% over the 90-year period.

Patterns in Treasury Bill Returns

During the late 1920s and early 1930s, Treasury bill returns were just above zero. (These returns were observed during a largely deflationary period.) Beginning in late 1941, the government kept Treasury bill yields low despite high inflation rates. Treasury bills closely tracked inflation after March 1951, when Treasury bill yields were deregulated in the U.S. Treasury/Federal Reserve Accord. This tracking relationship has weakened since 1973. From 1974 to 1980, Treasury bill returns were generally lower than inflation rates. From 1981 to 2008, real returns on Treasury bills have been positive, with the exception of 2002–2005. Real Treasury bill returns were also negative from 2009 to 2015.

Federal Reserve Operating Procedure Changes

The disparity between performance and volatility for the periods prior to and after October 1979 can be attributed to the Federal Reserve's new operating procedures. Prior to this date, the Fed used the federal funds rate as an operating target. Subsequently, the Fed de-emphasized this rate as an operating target and, instead, began to focus on the manipulation of the money supply (through non-borrowed reserves). As a result, the federal funds rate underwent much greater volatility, thereby bringing about greater volatility in Treasury returns. In the fall of 1982, however, the Federal Reserve again changed the policy procedures regarding its monetary policy. The Fed abandoned its new monetary controls and returned to a strategy of preventing excessive volatility in interest rates. Volatility in Treasury bill returns from the fall of 1979 through the fall of 1982 was significantly greater than that which has occurred since.

Inflation

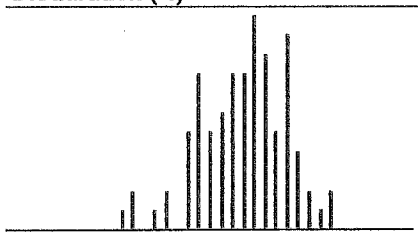
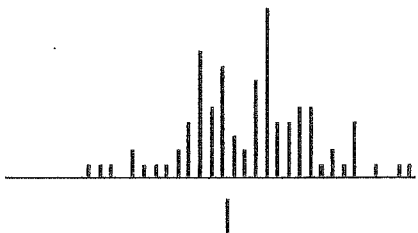
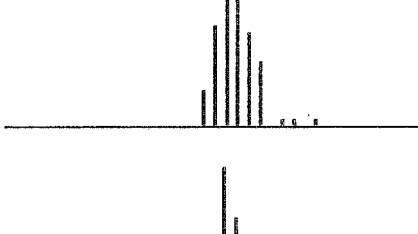
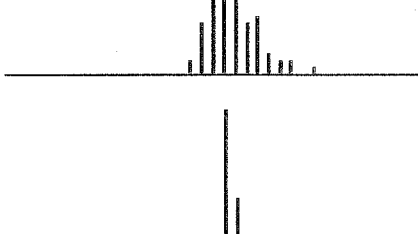
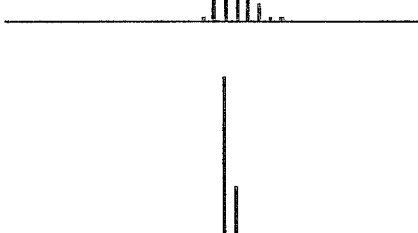
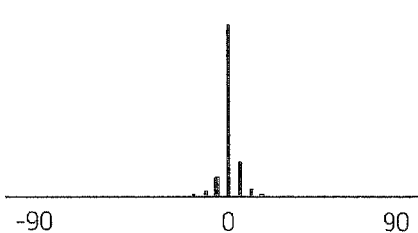

The compound annual inflation rate over 1926–2015 was 2.9%. The inflation index, initiated at \$1.00 at year end 1925, grew to \$13.25 by year-end 2015. It is interesting to note that the entire increase occurred during the postwar period (specifically, after April 1945).

The years 1926–1933 were generally *deflationary* in nature, and consumer prices did not rise back to their 1926 levels until April 1945. After a brief postwar spurt of inflation (in 1946 and 1947, inflation was 18.2% and 9.0%, respectively), prices rose slowly over most of the 1950s and 1960s. Then, in the 1970s, inflation reached a pace unprecedented in peacetime, peaking at 13.3% in 1979. The 1980s saw a reversion to more moderate, though still substantial, inflation rates averaging about 5% annually. Inflation rates continued to decline in the 1990s with a compound annual rate of 2.9%. Since 2000, inflation has been even milder, with a compound average rate of about 2.2%.

Summary Statistics of Total Returns

Exhibit 2.3 presents summary statistics of the annual total returns on each asset class over the entire 90-year period of 1926–2015. The data presented in these exhibits are described in detail in Chapters 3 and 6.

Exhibit 2.3: Basic Series, Summary Statistics of Annual Total Returns (%)
1926–2015

Series	Geometric Mean (%)	Arithmetic Mean (%)	Standard Deviation (%)	Distribution (%)
Large-Cap Stocks	10.0	12.0	20.0	
Small-Cap Stocks*	12.0	16.5	32.0	
Long-term Corp Bonds	6.0	6.3	8.4	
Long-term Gov't Bonds	5.6	6.0	10.0	
Inter-term Gov't Bonds	5.2	5.3	5.7	
U.S. Treasury Bills	3.4	3.5	3.1	
Inflation	2.9	3.0	4.1	

*The 1933 small-cap stocks total return was 142.9%, and is not shown here.

-90 0 90

Note that in Exhibit 2.3, the arithmetic mean returns are higher than the geometric mean returns. The difference between these two means is related to the standard deviation, or variability, of the series (see Chapter 6).

The "skylines," or histograms, in Exhibit 2.3 show the frequency distribution of returns for each asset class. The height of the skylines shows the number of years in the 1926–2015 period that had a return in that range. The histograms are shown in 5% increments (from -90% to 90%) to fully display the spectrum of returns as seen over the last 90 years, especially in stocks.

Riskier assets, such as large- and small-cap stocks, have spread-out skylines, reflecting the broad distribution of returns from very poor to very good. Less-risky assets, such as bonds, have narrow skylines that resemble a single tall building, indicating the tightness of the distribution around the mean of the series. The histogram for Treasury bills is one-sided, lying almost entirely to the right of the vertical line representing a zero return; that is, Treasury bills almost never experienced negative returns on a yearly basis over the 1926–2015 period (the only negative year was 1938). The inflation skyline shows both positive and negative annual rates. Although a few deflationary months and quarters have occurred recently, the last negative annual inflation rate occurred in 1954.

Appreciation, Income, and Reinvestment Returns

Exhibit 2.4 provides further detail on the returns of large-cap stocks, long-term government bonds, and intermediate-term government bonds. Total annual returns are shown as the sum of three components: capital appreciation returns, income returns, and reinvestment returns. The capital appreciation and income components are explained in Chapter 3. The third component, reinvestment return, reflects monthly income reinvested in the total return index in subsequent months in the year. Thus, for a single month the reinvestment return is zero, but over a longer period of time it is nonzero. Because the returns in Exhibit 2.4 are annual, reinvestment return is relevant.

The annual total return formed by compounding the monthly total returns does not equal the sum of the annual capital appreciation and income components; the difference is reinvestment return. A simple example illustrates this point. In 1995, an "up" year on a total return basis, the total annual return on large-cap stocks was 37.58%. The annual capital appreciation was 34.11% and the annual income return was 3.04%, totaling 37.15%. The remaining 0.43% (37.58% minus 37.15%) of the 1995 total return came from the reinvestment of dividends in the market. For more information on calculating annual total and income returns, see Chapter 5.

Monthly income and capital appreciation returns for large-cap stocks are presented at the back of this book in Appendix A-2 and Appendix A-3, respectively. Monthly income and capital appreciation returns are presented for long-term government bonds in Appendix A-7 and Appendix A-8; and for intermediate-term government bonds in Appendix A-11 and Appendix A-12.

Exhibit 2.4: Large-Cap Stocks, Long-term Government Bonds, and Intermediate-term Government Bonds; Annual Total, Income, Capital Appreciation, and Reinvestment Returns (%)

Year	Large-Cap Stocks				Long-term Gov't Bonds				Year-end Yield	Intermediate-term Gov't Bonds				
	Capital Appreciation Return	Income Return	Reinvest-ment Return	Total Return	Capital Appreciation Return	Income Return	Reinvest-ment Return	Total Return		Capital Appreciation Return	Income Return	Reinvest-ment Return	Total Return	Year-end Yield
1926	5.72	5.41	0.50	11.62	3.91	3.73	0.13	7.77	3.54	1.51	3.78	0.10	5.38	3.61
1927	30.91	5.71	0.87	37.49	5.40	3.41	0.12	8.93	3.17	0.96	3.49	0.07	4.52	3.40
1928	37.88	4.81	0.91	43.61	-3.12	3.22	0.01	0.10	3.40	-2.73	3.64	0.01	0.92	4.01
1929	-11.91	3.98	-0.49	-8.42	-0.20	3.47	0.15	3.42	3.40	1.77	4.07	0.18	6.01	3.62
1930	-28.48	4.57	-0.98	-24.90	1.28	3.32	0.05	4.66	3.30	3.30	3.30	0.11	6.72	2.91
1931	-47.07	5.35	-1.62	-43.34	-8.46	3.33	-0.17	-5.31	4.07	-5.40	3.16	-0.08	-2.32	4.12
1932	-15.15	6.16	0.80	-8.19	12.94	3.69	0.22	16.84	3.15	5.02	3.63	0.16	8.81	3.04
1933	46.59	6.39	1.01	53.99	-3.14	3.12	-0.05	-0.07	3.36	-0.99	2.83	-0.02	1.83	3.25
1934	-5.94	4.46	0.04	-1.44	6.76	3.18	0.09	10.03	2.93	5.97	2.93	0.09	9.00	2.49
1935	41.37	4.95	1.35	47.67	2.14	2.81	0.03	4.98	2.76	4.94	2.02	0.05	7.01	1.63
1936	27.92	5.36	0.64	33.92	4.64	2.77	0.10	7.52	2.55	1.60	1.44	0.02	3.06	1.29
1937	-38.59	4.66	-1.09	-35.03	-2.48	2.66	0.05	0.23	2.73	0.05	1.48	0.03	1.56	1.14
1938	25.21	4.83	1.07	31.12	2.83	2.64	0.06	5.53	2.52	4.37	1.82	0.04	6.23	1.52
1939	-5.45	4.69	0.35	-0.41	3.48	2.40	0.06	5.94	2.26	3.18	1.31	0.03	4.52	0.98
1940	-15.29	5.36	0.14	-9.78	3.77	2.23	0.09	6.09	1.94	2.04	0.90	0.02	2.96	0.57
1941	-17.86	6.71	-0.44	-11.59	-1.01	1.94	0.00	0.93	2.04	-0.17	0.67	0.00	0.50	0.82
1942	12.43	6.79	1.12	20.34	0.74	2.46	0.02	3.22	2.46	1.17	0.76	0.00	1.94	0.72
1943	19.45	6.24	0.21	25.90	-0.37	2.44	0.02	2.08	2.48	1.23	1.56	0.02	2.81	1.45
1944	13.80	5.48	0.47	19.75	0.32	2.46	0.03	2.81	2.46	0.35	1.44	0.01	1.80	1.40
1945	30.72	4.97	0.74	36.44	8.27	2.34	0.12	10.73	1.99	1.02	1.19	0.01	2.22	1.03
1946	-11.87	4.09	-0.29	-8.07	-2.15	2.04	0.01	-0.10	2.12	-0.08	1.08	0.00	1.00	1.12
1947	0.00	5.49	0.22	5.71	-4.70	2.13	-0.06	-2.62	2.43	-0.30	1.21	0.00	0.91	1.34
1948	-0.65	6.08	0.08	5.50	0.96	2.40	0.04	3.40	2.37	0.27	1.56	0.01	1.85	1.51
1949	10.26	7.50	1.03	18.79	4.15	2.25	0.06	6.45	2.09	0.95	1.36	0.01	2.32	1.23
1950	21.78	8.77	1.16	31.71	-2.06	2.12	0.00	0.06	2.24	-0.69	1.39	0.00	0.70	1.62
1951	16.46	6.91	0.65	24.02	-6.27	2.38	-0.04	-3.93	2.69	-1.63	1.98	0.01	0.36	2.17
1952	11.78	5.93	0.66	18.37	-1.48	2.66	-0.02	1.16	2.79	-0.57	2.19	0.01	1.63	2.35
1953	-6.62	5.46	0.18	-0.99	0.67	2.84	0.12	3.64	2.74	0.61	2.55	0.07	3.23	2.18
1954	45.02	6.21	1.39	52.62	4.35	2.79	0.05	7.19	2.72	1.08	1.60	0.01	2.68	1.72
1955	26.40	4.56	0.60	31.56	-4.07	2.75	0.03	-1.29	2.95	-3.10	2.45	0.00	-0.65	2.80
1956	2.62	3.83	0.11	6.56	-8.46	2.99	-0.12	-5.59	3.45	-3.45	3.05	-0.02	-0.42	3.63
1957	-14.31	3.84	-0.30	-10.78	3.82	3.44	0.20	7.46	3.23	4.05	3.59	0.20	7.84	2.84
1958	38.06	4.38	0.93	43.36	-9.23	3.27	-0.14	-6.09	3.82	-4.17	2.93	-0.05	-1.29	3.81
1959	8.48	3.31	0.16	11.96	-6.20	4.01	-0.07	-2.26	4.47	-4.56	4.18	-0.01	-0.39	4.98
1960	-2.97	3.26	0.19	0.47	9.29	4.26	0.23	13.78	3.80	7.42	4.15	0.19	11.76	3.31
1961	23.13	3.48	0.28	26.89	-2.86	3.83	0.00	0.97	4.15	-1.72	3.54	0.03	1.85	3.84
1962	-11.81	2.98	0.10	-8.73	2.78	4.00	0.11	6.89	3.95	1.73	3.73	0.10	5.56	3.50
1963	18.89	3.61	0.30	22.80	-2.70	3.89	0.02	1.21	4.17	-2.10	3.71	0.03	1.64	4.04
1964	12.97	3.33	0.18	16.48	-0.72	4.15	0.07	3.51	4.23	-0.03	4.00	0.07	4.04	4.03
1965	9.06	3.21	0.18	12.45	-3.45	4.19	-0.04	0.71	4.50	-3.10	4.15	-0.03	1.02	4.90
1966	-13.09	3.11	-0.08	-10.06	-1.06	4.49	0.22	3.65	4.55	-0.41	4.93	0.17	4.69	4.79
1967	20.09	3.64	0.25	23.98	-13.55	4.59	-0.23	-9.18	5.56	-3.85	4.88	-0.02	1.01	5.77
1968	7.66	3.18	0.22	11.06	-5.51	5.50	-0.25	-0.26	5.98	-0.99	5.49	0.03	4.54	5.96
1969	-11.36	2.98	-0.13	-8.50	-10.83	5.95	-0.19	-5.07	6.87	-7.27	6.65	-0.11	-0.74	8.29
1970	0.10	3.33	0.43	3.86	4.84	6.74	0.52	12.11	6.48	8.71	7.49	0.66	16.86	5.90

Exhibit 2.4: Large-Cap Stocks, Long-term Government Bonds, and Intermediate-term Government Bonds; Annual Total, Income, Capital Appreciation, and Reinvestment Returns (%)

Year	Large-Cap Stocks				Long-term Gov't Bonds				Year-end Yield	Intermediate-term Gov't Bonds				
	Capital Appreciation Return	Income Return	Reinvest-ment Return	Total Return	Capital Appreciation Return	Income Return	Reinvest-ment Return	Total Return		Capital Appreciation Return	Income Return	Reinvest-ment Return	Total Return	Year-end Yield
1971	10.63	3.49	0.18	14.30	6.61	6.32	0.31	13.23	5.97	2.72	5.75	0.25	8.72	5.25
1972	15.79	2.95	0.25	18.99	-0.35	5.87	0.17	5.69	5.99	-0.75	5.75	0.16	5.16	5.85
1973	-17.37	2.86	-0.19	-14.69	-7.70	6.51	0.08	-1.11	7.26	-2.19	6.58	0.22	4.61	6.79
1974	-29.72	3.69	-0.44	-26.47	-3.45	7.27	0.54	4.35	7.60	-1.99	7.24	0.44	5.69	7.12
1975	31.55	5.37	0.31	37.23	0.73	7.99	0.47	9.20	8.05	0.12	7.35	0.36	7.83	7.19
1976	19.15	4.49	0.29	23.93	8.07	7.89	0.80	16.75	7.21	5.25	7.10	0.51	12.87	6.00
1977	-11.50	4.35	0.00	-7.16	-7.86	7.14	0.04	-0.69	8.03	-5.15	6.49	0.06	1.41	7.51
1978	1.06	5.33	0.18	6.57	-9.05	7.90	-0.03	-1.18	8.98	-4.49	7.83	0.14	3.49	8.83
1979	12.31	5.89	0.41	18.61	-9.84	8.86	-0.25	-1.23	10.12	-5.07	9.04	0.12	4.09	10.33
1980	25.77	5.74	0.99	32.50	-14.00	9.97	0.08	-3.95	11.99	-6.81	10.55	0.17	3.91	12.45
1981	-9.73	4.88	-0.08	-4.92	-10.33	11.55	0.64	1.86	13.34	-4.55	12.97	1.03	9.45	13.96
1982	14.76	5.61	1.18	21.55	23.95	13.50	2.91	40.36	10.95	14.23	12.81	2.06	29.10	9.90
1983	17.27	5.04	0.24	22.56	-9.82	10.38	0.09	0.65	11.97	-3.30	10.35	0.35	7.41	11.41
1984	1.40	4.57	0.31	6.27	2.32	11.74	1.42	15.48	11.70	1.22	11.68	1.12	14.02	11.04
1985	26.33	4.72	0.67	31.73	17.84	11.25	1.88	30.97	9.56	9.01	10.29	1.04	20.33	8.55
1986	14.62	3.92	0.13	18.67	14.99	8.98	0.56	24.53	7.89	6.99	7.72	0.43	15.14	6.85
1987	2.03	3.64	-0.41	5.25	-10.69	7.92	0.06	-2.71	9.20	-4.75	7.47	0.19	2.90	8.32
1988	12.40	3.99	0.22	16.61	0.36	8.97	0.34	9.67	9.19	-2.26	8.24	0.13	6.10	9.17
1989	27.25	4.03	0.40	31.69	8.62	8.81	0.68	18.11	8.16	4.34	8.46	0.49	13.29	7.94
1990	-6.56	3.43	0.03	-3.10	-2.61	8.19	0.61	6.18	8.44	1.02	8.15	0.56	9.73	7.70
1991	26.31	3.76	0.40	30.47	10.10	8.22	0.98	19.30	7.30	7.36	7.43	0.67	15.46	5.97
1992	4.46	2.98	0.17	7.62	0.34	7.26	0.45	8.05	7.26	0.64	6.27	0.28	7.19	6.11
1993	7.06	2.91	0.12	10.08	10.71	7.17	0.35	18.24	6.54	5.56	5.53	0.15	11.24	5.22
1994	-1.54	2.83	0.03	1.32	-14.29	6.59	-0.08	-7.77	7.99	-11.14	6.07	-0.08	-5.14	7.80
1995	34.11	3.04	0.43	37.58	23.04	7.60	1.03	31.67	6.03	9.66	6.69	0.45	16.80	5.38
1996	20.26	2.43	0.26	22.96	-7.37	6.18	0.26	-0.93	6.73	-3.90	5.82	0.18	2.10	6.16
1997	31.01	2.10	0.25	33.36	8.51	6.64	0.71	15.85	6.02	1.95	6.14	0.30	8.38	5.73
1998	26.67	1.67	0.24	28.58	6.89	5.83	0.34	13.06	5.42	4.66	5.29	0.25	10.21	4.68
1999	19.53	1.36	0.15	21.04	-14.35	5.57	-0.19	-8.96	6.82	-7.06	5.30	-0.01	-1.77	6.45
2000	-10.14	1.11	-0.07	-9.10	14.36	6.50	0.62	21.48	5.58	5.94	6.19	0.46	12.59	5.07
2001	-13.04	1.18	-0.03	-11.89	-1.89	5.53	0.06	3.70	5.75	3.23	4.27	0.12	7.62	4.42
2002	-23.37	1.39	-0.13	-22.10	11.69	5.59	0.56	17.84	4.84	8.65	3.98	0.30	12.93	2.61
2003	26.38	1.99	0.31	28.68	-3.36	4.80	0.01	1.45	5.11	-0.48	2.85	0.03	2.40	2.97
2004	8.99	1.76	0.13	10.88	3.26	5.02	0.23	8.51	4.84	-1.07	3.28	0.04	2.25	3.47
2005	3.00	1.84	0.07	4.91	3.02	4.69	0.10	7.81	4.61	-2.58	3.92	0.03	1.36	4.34
2006	13.62	2.01	0.17	15.79	-3.64	4.68	0.15	1.19	4.91	-1.51	4.54	0.11	3.14	4.65
2007	3.53	1.96	0.00	5.49	4.69	4.86	0.33	9.88	4.50	5.33	4.44	0.28	10.05	3.28
2008	-38.49	1.92	-0.43	-37.00	20.50	4.45	0.93	25.87	3.03	9.92	2.96	0.23	13.11	1.26
2009	23.45	2.48	0.53	26.46	-18.25	3.47	-0.12	-14.90	4.58	-4.42	2.01	0.00	-2.40	2.42
2010	12.78	2.02	0.26	15.06	5.89	4.25	0.00	10.14	4.14	5.16	1.92	0.04	7.12	1.70
2011	0.00	2.13	-0.01	2.11	22.62	3.82	0.66	27.10	2.55	7.09	1.64	0.08	8.81	0.74
2012	13.41	2.50	0.10	16.00	0.95	2.46	0.03	3.43	2.46	0.93	0.73	0.01	1.66	0.61
2013	29.60	2.48	0.31	32.39	-15.70	2.88	0.04	-12.78	3.78	-4.68	1.02	-0.01	-3.68	1.49
2014	11.39	2.16	0.14	13.69	20.93	3.41	0.37	24.71	2.46	1.35	1.63	0.02	3.00	1.55
2015	-0.73	2.10	0.01	1.38	-3.11	2.47	-0.02	-0.65	2.68	0.29	1.51	0.00	1.79	1.69

Annual Total Returns

Exhibit 2.5 shows annual total returns for the six basic asset classes and inflation for the full 90-year period. This exhibit can be used to compare the performance of each asset class for the same year. Monthly total returns for large-cap stocks, small-cap stocks, long-term corporate bonds, long-term government bonds, intermediate-term government bonds, Treasury bills, and inflation rates are presented in Appendices A-1, A-4, A-5, A-6, A-10, A-14, and A-15, respectively.

Rolling-Period Returns

Exhibits 2.6, 2.7, and 2.8 show the compound annual total returns of the six basic classes and inflation for five-, 10-, and 20-year holding periods. Often, these calculations are referred to as rolling period returns because they are obtained by rolling a data window of fixed length along each time series. They are useful for examining the behavior of returns for holding periods similar to those actually experienced by investors and show the effects of time diversification. Holding assets for long periods of time has the effect of lowering the risk of experiencing a loss in asset value.

The highest and lowest returns on the SBBBI basic series, expressed as annual rates, are shown for one-, five-, 10-, and 20-year holding periods in Exhibit 2.9. This exhibit also shows the number of times that an asset had a positive return, and the number of times that an asset's return was the highest among all those studied. The number of times positive (or times highest) is compared to the total number of observations – that is, 90 annual, 86 overlapping five-year, 81 overlapping 10-year, and 71 overlapping 20-year holding periods.

Portfolio Performance

A portfolio is a group of assets, such as stocks and bonds that are held by an investor. Because stocks, bonds, and cash generally do not react identically to the same economic or market stimulus, combining these assets can often produce a better risk-adjusted return. There were plenty of years in which stock returns were up at times when bond returns were down, and vice versa, according to the data in Exhibit 2.4. These offsetting movements can assist in reducing portfolio volatility. Some recent examples include the years 2000 through 2002: Large-cap stocks posted returns of -9.10%, -11.89%, and -22.10%, respectively, while long-term government bonds posted positive returns of 21.48%, 3.70%, and 17.84%, respectively. This illustrates the low correlation of stocks and bonds; that is, they tend to move independently of each other. (See Chapter 6 for a more detailed discussion of correlation.)

While bond prices tend to fluctuate less than stock prices, they are still subject to price movement. Investing in a mix of asset classes, such as stocks, bonds, and Treasury bills (cash), may protect a portfolio from major downswings in a single asset class. One of the main advantages of diversification is that it makes investors less dependent on the performance of any single asset class.

Rolling Period Portfolio Returns

While Exhibit 2.9 displays the performance of single asset classes over various rolling periods, Exhibits 2.10 through 2.14 show the performance of different portfolio allocations over various periods. Once again, Exhibit 2.10 outlines the number of times that each portfolio has a positive return, and the number of times that each portfolio's return was the highest among all those studied. Maximum and minimum returns are also shown. The portfolios presented throughout the analysis are rebalanced so that the allocations remain the same. The exception is Exhibit 2.12, which contains portfolios that were never rebalanced; this is for comparison purposes. The data assumes reinvestment of all income and does not account for taxes or transaction costs.

The one-year holding period results in Exhibit 2.10 make it clear that 1933 was a great year for large-cap stocks, while long-term government bonds shined in 1982. The 30% stock and 70% bond portfolio posted positive returns during all but one-year for five-year holding periods, while the 70% stock and 30% bond portfolio was the highest returning portfolio for one-year during the five-year holding periods. The 10-year holding period analysis shows that the 100% stock and the 100% bond portfolios were the only ones that posted negative 10-year holding period returns. For the 20-year period, there were no negative holding period returns. The effects of time diversification are clearly evident. When portfolios, as well as individual asset classes, are held for longer periods of time, the possibility of losing portfolio value is lowered.

Exhibit 2.5: Basic Series
Annual Total Returns (%)

Year	Large-Cap Stocks	Small-Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1926	11.62	0.28	7.37	7.77	5.38	3.27	-1.49
1927	37.49	22.10	7.44	8.93	4.52	3.12	-2.08
1928	43.61	39.69	2.84	0.10	0.92	3.56	-0.97
1929	-8.42	-51.36	3.27	3.42	6.01	4.75	0.20
1930	-24.90	-38.15	7.98	4.66	6.72	2.41	-6.03
1931	-43.34	-49.75	-1.85	-5.31	-2.32	1.07	-9.52
1932	-8.19	-5.39	10.82	16.84	8.81	0.96	-10.30
1933	53.99	142.87	10.38	-0.07	1.83	0.30	0.51
1934	-1.44	24.22	13.84	10.03	9.00	0.16	2.03
1935	47.67	40.19	9.61	4.98	7.01	0.17	2.99
1936	33.92	64.80	6.74	7.52	3.06	0.18	1.21
1937	-35.03	-58.01	2.75	0.23	1.56	0.31	3.10
1938	31.12	32.80	6.13	5.53	6.23	-0.02	-2.78
1939	-0.41	0.35	3.97	5.94	4.52	0.02	-0.48
1940	-9.78	-5.16	3.39	6.09	2.96	0.00	0.96
1941	-11.59	-9.00	2.73	0.93	0.50	0.06	9.72
1942	20.34	44.51	2.60	3.22	1.94	0.27	9.29
1943	25.90	88.37	2.83	2.08	2.81	0.35	3.16
1944	19.75	53.72	4.73	2.81	1.80	0.33	2.11
1945	36.44	73.61	4.08	10.73	2.22	0.33	2.25
1946	-8.07	-11.63	1.72	-0.10	1.00	0.35	18.16
1947	5.71	0.92	-2.34	-2.62	0.91	0.50	9.01
1948	5.50	-2.11	4.14	3.40	1.85	0.81	2.71
1949	18.79	19.75	3.31	6.45	2.32	1.10	-1.80
1950	31.71	38.75	2.12	0.06	0.70	1.20	5.79
1951	24.02	7.80	-2.69	-3.93	0.36	1.49	5.87
1952	18.37	3.03	3.52	1.16	1.63	1.66	0.88
1953	-0.99	-6.49	3.41	3.64	3.23	1.82	0.62
1954	52.62	60.58	5.39	7.19	2.68	0.86	-0.50
1955	31.56	20.44	0.48	-1.29	-0.65	1.57	0.37
1956	6.56	4.28	-6.81	-5.59	-0.42	2.46	2.86
1957	-10.78	-14.57	8.71	7.46	7.84	3.14	3.02
1958	43.36	64.89	-2.22	-6.09	-1.29	1.54	1.76
1959	11.96	16.40	-0.97	-2.26	-0.39	2.95	1.50
1960	0.47	-3.29	9.07	13.78	11.76	2.66	1.48
1961	26.89	32.09	4.82	0.97	1.85	2.13	0.67
1962	-8.73	-11.90	7.95	6.89	5.56	2.73	1.22
1963	22.80	23.57	2.19	1.21	1.64	3.12	1.65
1964	16.48	23.52	4.77	3.51	4.04	3.54	1.19
1965	12.45	41.75	-0.46	0.71	1.02	3.93	1.92
1966	-10.06	-7.01	0.20	3.65	4.69	4.76	3.35
1967	23.98	83.57	-4.95	-9.18	1.01	4.21	3.04
1968	11.06	35.97	2.57	-0.26	4.54	5.21	4.72
1969	-8.50	-25.05	-8.09	-5.07	-0.74	6.58	6.11
1970	3.86	-17.43	18.37	12.11	16.86	6.52	5.49
1971	14.30	16.50	11.01	13.23	8.72	4.39	3.36
1972	18.99	4.43	7.26	5.69	5.16	3.84	3.41
1973	-14.69	-30.90	1.14	-1.11	4.61	6.93	8.80
1974	-26.47	-19.95	-3.06	4.35	5.69	8.00	12.20

Exhibit 2.5: Basic Series

Annual Total Returns (%)

Year	Large-Cap Stocks	Small-Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1975	37.23	52.82	14.64	9.20	7.83	5.80	7.01
1976	23.93	57.38	18.65	16.75	12.87	5.08	4.81
1977	-7.16	25.38	1.71	-0.69	1.41	5.12	6.77
1978	6.57	23.46	-0.07	-1.18	3.49	7.18	9.03
1979	18.61	43.46	-4.18	-1.23	4.09	10.38	13.31
1980	32.50	39.88	-2.76	-3.95	3.91	11.24	12.40
1981	-4.92	13.88	-1.24	1.86	9.45	14.71	8.94
1982	21.55	28.01	42.56	40.36	29.10	10.54	3.87
1983	22.56	39.67	6.26	0.65	7.41	8.80	3.80
1984	6.27	-6.67	16.86	15.48	14.02	9.85	3.95
1985	31.73	24.66	30.09	30.97	20.33	7.72	3.77
1986	18.67	6.85	19.85	24.53	15.14	6.16	1.13
1987	5.25	-9.30	-0.27	-2.71	2.90	5.47	4.41
1988	16.61	22.87	10.70	9.67	6.10	6.35	4.42
1989	31.69	10.18	16.23	18.11	13.29	8.37	4.65
1990	-3.10	-21.56	6.78	6.18	9.73	7.81	6.11
1991	30.47	44.63	19.89	19.30	15.46	5.60	3.06
1992	7.62	23.35	9.39	8.05	7.19	3.51	2.90
1993	10.08	20.98	13.19	18.24	11.24	2.90	2.75
1994	1.32	3.11	-5.76	-7.77	-5.14	3.90	2.67
1995	37.58	34.46	27.20	31.67	16.80	5.60	2.54
1996	22.96	17.62	1.40	-0.93	2.10	5.21	3.32
1997	33.36	22.78	12.95	15.85	8.38	5.26	1.70
1998	28.58	-7.31	10.76	13.06	10.21	4.86	1.61
1999	21.04	29.79	-7.45	-8.96	-1.77	4.68	2.68
2000	-9.10	-3.59	12.87	21.48	12.59	5.89	3.39
2001	-11.89	22.77	10.65	3.70	7.62	3.83	1.55
2002	-22.10	-13.28	16.33	17.84	12.93	1.65	2.38
2003	28.68	60.70	5.27	1.45	2.40	1.02	1.88
2004	10.88	18.39	8.72	8.51	2.25	1.20	3.26
2005	4.91	5.69	5.87	7.81	1.36	2.98	3.42
2006	15.79	16.17	3.24	1.19	3.14	4.80	2.54
2007	5.49	-5.22	2.60	9.88	10.05	4.66	4.08
2008	-37.00	-36.72	8.78	25.87	13.11	1.60	0.09
2009	26.46	28.09	3.02	-14.90	-2.40	0.10	2.72
2010	15.06	31.26	12.44	10.14	7.12	0.12	1.50
2011	2.11	-3.26	17.95	27.10	8.81	0.04	2.96
2012	16.00	18.24	10.68	3.43	1.66	0.06	1.74
2013	32.39	45.07	-7.07	-12.78	-3.68	0.02	1.51
2014	13.69	2.92	17.28	24.71	3.00	0.02	0.76
2015	1.38	-3.60	-1.02	-0.65	1.79	0.02	1.18

Exhibit 2.6:-Basic Series

Compound Annual Returns for 5-Year Holding Periods (% per annum)

5-Year Period	Large- Cap Stocks	Small- Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1926-1930	8.68	-12.44	5.76	4.93	4.69	3.42	-2.10
1927-1931	-5.10	-23.74	3.87	2.25	3.11	2.98	-3.75
1928-1932	-12.47	-27.54	4.52	3.69	3.95	2.54	-5.42
1929-1933	-11.24	-19.06	6.01	3.66	4.13	1.89	-5.14
1930-1934	-9.93	-2.37	8.09	4.95	4.71	0.98	-4.80
1931-1935	3.12	14.99	8.42	5.01	4.77	0.53	-3.04
1932-1936	22.47	45.83	10.26	7.71	5.90	0.35	-0.84
1933-1937	14.29	23.96	8.60	4.46	4.45	0.22	1.96
1934-1938	10.67	9.86	7.75	5.61	5.33	0.16	1.29
1935-1939	10.91	5.27	5.81	4.81	4.46	0.13	0.78
1936-1940	0.50	-2.64	4.59	5.03	3.65	0.10	0.38
1937-1941	-7.51	-13.55	3.79	3.71	3.13	0.08	2.02
1938-1942	4.62	10.70	3.76	4.32	3.21	0.07	3.21
1939-1943	3.77	18.71	3.10	3.63	2.54	0.14	4.44
1940-1944	7.67	29.28	3.25	3.01	2.00	0.20	4.98
1941-1945	16.96	45.90	3.39	3.90	1.85	0.27	5.25
1942-1946	17.87	45.05	3.19	3.69	1.95	0.33	6.82
1943-1947	14.86	35.00	2.17	2.49	1.75	0.37	6.77
1944-1948	10.87	18.43	2.43	2.75	1.55	0.47	6.67
1945-1949	10.69	12.66	2.15	3.46	1.66	0.62	5.84
1946-1950	9.91	7.72	1.76	1.39	1.36	0.79	6.57
1947-1951	16.70	12.09	0.87	0.60	1.23	1.02	4.25
1948-1952	19.37	12.55	2.05	1.37	1.37	1.25	2.65
1949-1953	17.86	11.53	1.91	1.41	1.64	1.45	2.23
1950-1954	23.92	18.27	2.31	1.55	1.72	1.41	2.50
1951-1955	23.89	14.97	1.98	1.28	1.44	1.48	1.43
1952-1956	20.18	14.21	1.10	0.93	1.28	1.67	0.84
1953-1957	13.58	10.01	2.10	2.15	2.49	1.97	1.27
1954-1958	22.31	23.22	0.96	0.16	1.58	1.91	1.49
1955-1959	14.96	15.54	-0.29	-1.67	0.96	2.33	1.90
1956-1960	8.92	10.58	1.36	1.16	3.37	2.55	2.12
1957-1961	12.79	15.93	3.77	2.53	3.83	2.48	1.68
1958-1962	13.31	16.65	3.63	2.42	3.39	2.40	1.33
1959-1963	9.85	10.11	4.55	3.97	4.00	2.72	1.30
1960-1964	10.73	11.43	5.73	5.17	4.91	2.83	1.24
1961-1965	13.25	20.28	3.82	2.63	2.81	3.09	1.33
1962-1966	5.72	12.13	2.88	3.17	3.38	3.61	1.86
1963-1967	12.39	29.86	0.30	-0.14	2.47	3.91	2.23
1964-1968	10.16	32.37	0.37	-0.43	3.04	4.33	2.84
1965-1969	4.96	19.78	-2.22	-2.14	2.08	4.93	3.82
1966-1970	3.31	7.51	1.23	-0.02	5.10	5.45	4.54
1967-1971	8.38	12.47	3.32	1.77	5.90	5.38	4.54
1968-1972	7.50	0.47	5.85	4.90	6.75	5.30	4.61
1969-1973	1.97	-12.25	5.55	4.72	6.77	5.65	5.41
1970-1974	-2.39	-11.09	6.68	6.72	8.11	5.93	6.60
1971-1975	3.21	0.56	6.00	6.16	6.39	5.78	6.90
1972-1976	4.89	6.80	7.42	6.82	7.19	5.92	7.20
1973-1977	-0.19	10.77	6.29	5.50	6.41	6.18	7.89
1974-1978	4.35	24.41	6.03	5.48	6.18	6.23	7.94
1975-1979	14.82	39.80	5.78	4.33	5.86	6.69	8.15
1976-1980	14.02	37.35	2.36	1.68	5.08	7.77	9.21
1977-1981	8.13	28.75	-1.33	-1.05	4.44	9.67	10.06
1978-1982	14.12	29.28	5.57	6.03	9.60	10.78	9.46

Exhibit 2.6: Basic Series

Compound Annual Returns for 5-Year Holding Periods (% per annum)

5-Year Period	Large- Cap Stocks	Small- Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1979-1983	17.35	32.51	6.87	6.42	10.42	11.12	8.39
1980-1984	14.80	21.59	11.20	9.80	12.45	11.01	6.53
1981-1985	14.67	18.82	17.86	16.83	15.80	10.30	4.85
1982-1986	19.87	17.32	22.51	21.62	16.98	8.60	3.30
1983-1987	16.47	9.51	14.06	13.02	11.79	7.59	3.41
1984-1988	15.31	6.74	15.00	14.98	11.52	7.10	3.53
1985-1989	20.36	10.34	14.88	15.50	11.38	6.81	3.67
1986-1990	13.19	0.58	10.43	10.75	9.34	6.83	4.13
1987-1991	15.36	6.86	10.44	9.81	9.40	6.71	4.52
1988-1992	15.88	13.63	12.50	12.14	10.30	6.31	4.22
1989-1993	14.55	13.28	13.00	13.84	11.35	5.61	3.89
1990-1994	8.70	11.79	8.36	8.34	7.46	4.73	3.49
1991-1995	16.59	24.51	12.22	13.10	8.81	4.29	2.79
1992-1996	15.22	19.47	8.52	8.98	6.17	4.22	2.84
1993-1997	20.27	19.35	9.22	10.51	6.40	4.57	2.60
1994-1998	24.06	13.16	8.74	9.52	6.20	4.96	2.37
1995-1999	28.56	18.49	8.35	9.24	6.95	5.12	2.37
1996-2000	18.33	10.87	5.79	7.49	6.17	5.18	2.54
1997-2001	10.70	11.82	7.66	8.48	7.29	4.90	2.18
1998-2002	-0.59	4.31	8.29	8.85	8.18	4.17	2.32
1999-2003	-0.57	16.44	7.20	6.51	6.60	3.40	2.37
2000-2004	-2.30	14.32	10.70	10.32	7.46	2.70	2.49
2001-2005	0.54	16.44	9.30	7.72	5.22	2.13	2.49
2002-2006	6.19	15.16	7.79	7.19	4.33	2.32	2.69
2003-2007	12.83	17.23	5.12	5.70	3.79	2.92	3.03
2004-2008	-2.19	-2.71	5.81	10.36	5.88	3.04	2.67
2005-2009	0.42	-1.16	4.68	5.13	4.90	2.81	2.56
2006-2010	2.29	3.21	5.94	5.58	6.06	2.23	2.18
2007-2011	-0.25	-0.50	8.80	10.50	7.20	1.29	2.26
2008-2012	1.66	4.00	10.47	9.17	5.52	0.38	1.80
2009-2013	17.94	22.78	7.04	1.45	2.18	0.07	2.08
2010-2014	15.45	17.52	9.85	9.51	3.29	0.05	1.69
2011-2015	12.57	10.49	7.08	7.27	2.24	0.03	1.63

Exhibit 2.7: Basic Series

Compound Annual Returns for 10-Year Holding Periods (% per annum)

10-Year Period	Large- Cap Stocks	Small- Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1926-1935	5.86	0.34	7.08	4.97	4.73	1.97	-2.57
1927-1936	7.81	5.45	7.02	4.95	4.50	1.66	-2.30
1928-1937	0.02	-5.22	6.54	4.08	4.20	1.37	-1.80
1929-1938	-0.89	-5.70	6.88	4.63	4.73	1.02	-1.98
1930-1939	-0.05	1.38	6.95	4.88	4.58	0.55	-2.05
1931-1940	1.80	5.81	6.49	5.02	4.21	0.32	-1.34
1932-1941	6.43	12.28	6.97	5.69	4.51	0.21	0.58
1933-1942	9.35	17.14	6.15	4.39	3.83	0.15	2.59
1934-1943	7.17	14.20	5.40	4.62	3.93	0.15	2.85
1935-1944	9.28	16.66	4.53	3.91	3.22	0.17	2.86
1936-1945	8.42	19.18	3.99	4.46	2.75	0.18	2.79
1937-1946	4.41	11.98	3.49	3.70	2.54	0.20	4.39
1938-1947	9.62	22.24	2.96	3.40	2.48	0.22	4.97
1939-1948	7.26	18.57	2.77	3.19	2.04	0.30	5.55
1940-1949	9.17	20.69	2.70	3.24	1.83	0.41	5.41
1941-1950	13.38	25.37	2.57	2.64	1.60	0.53	5.91
1942-1951	17.28	27.51	2.02	2.13	1.59	0.67	5.53
1943-1952	17.09	23.27	2.11	1.93	1.56	0.81	4.69
1944-1953	14.31	14.93	2.17	2.08	1.60	0.96	4.43
1945-1954	17.12	15.43	2.23	2.51	1.69	1.01	4.16
1946-1955	16.69	11.29	1.87	1.33	1.40	1.14	3.96
1947-1956	18.43	13.14	0.98	0.76	1.25	1.35	2.53
1948-1957	16.44	11.27	2.07	1.76	1.93	1.61	1.96
1949-1958	20.06	17.23	1.43	0.79	1.61	1.68	1.86
1950-1959	19.35	16.90	1.00	-0.07	1.34	1.87	2.20
1951-1960	16.16	12.75	1.67	1.22	2.40	2.01	1.77
1952-1961	16.43	15.07	2.43	1.73	2.55	2.08	1.26
1953-1962	13.44	13.28	2.86	2.29	2.94	2.19	1.30
1954-1963	15.91	16.48	2.74	2.05	2.78	2.31	1.40
1955-1964	12.82	13.47	2.68	1.69	2.92	2.58	1.57
1956-1965	11.06	15.33	2.58	1.89	3.09	2.82	1.73
1957-1966	9.20	14.02	3.33	2.85	3.60	3.05	1.77
1958-1967	12.85	23.08	1.95	1.13	2.93	3.15	1.78
1959-1968	10.00	20.73	2.44	1.75	3.52	3.52	2.07
1960-1969	7.81	15.53	1.68	1.45	3.48	3.88	2.52
1961-1970	8.16	13.72	2.51	1.30	3.95	4.26	2.92
1962-1971	7.04	12.30	3.10	2.47	4.63	4.49	3.19
1963-1972	9.92	14.22	3.04	2.35	4.59	4.60	3.41
1964-1973	5.99	7.77	2.93	2.11	4.89	4.98	4.12
1965-1974	1.22	3.20	2.13	2.20	5.05	5.43	5.20
1966-1975	3.26	3.98	3.59	3.03	5.74	5.62	5.71
1967-1976	6.62	9.60	5.35	4.26	6.54	5.65	5.86
1968-1977	3.58	5.50	6.07	5.20	6.58	5.74	6.24
1969-1978	3.15	4.48	5.79	5.10	6.47	5.94	6.67
1970-1979	5.87	11.49	6.23	5.52	6.98	6.31	7.37
1971-1980	8.48	17.53	4.16	3.90	5.73	6.77	8.05
1972-1981	6.50	17.26	2.95	2.81	5.80	7.78	8.62
1973-1982	6.72	19.67	5.93	5.76	8.00	8.46	8.67
1974-1983	10.66	28.40	6.45	5.95	8.28	8.65	8.16
1975-1984	14.81	30.38	8.46	7.03	9.11	8.83	7.34
1976-1985	14.34	27.75	9.84	8.99	10.31	9.03	7.01
1977-1986	13.85	22.90	9.95	9.70	10.53	9.14	6.63
1978-1987	15.29	18.99	9.73	9.47	10.69	9.17	6.39

Exhibit 2.7: Basic Series

Compound Annual Returns for 10-Year Holding Periods (% per annum)

10-Year Period	Large- Cap Stocks	Small- Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1979-1988	16.33	18.93	10.86	10.62	10.97	9.09	5.93
1980-1989	17.55	15.83	13.02	12.62	11.91	8.89	5.09
1981-1990	13.93	9.32	14.09	13.75	12.52	8.55	4.49
1982-1991	17.59	11.97	16.32	15.56	13.13	7.65	3.91
1983-1992	16.17	11.55	13.28	12.58	11.04	6.95	3.81
1984-1993	14.93	9.96	14.00	14.41	11.43	6.35	3.71
1985-1994	14.38	11.06	11.57	11.86	9.40	5.76	3.58
1986-1995	14.88	11.90	11.32	11.92	9.08	5.55	3.46
1987-1996	15.29	12.98	9.48	9.39	7.77	5.46	3.68
1988-1997	18.05	16.46	10.85	11.32	8.33	5.44	3.41
1989-1998	19.21	13.22	10.85	11.66	8.74	5.29	3.12
1990-1999	18.21	15.09	8.36	8.79	7.20	4.92	2.93
1991-2000	17.46	17.49	8.96	10.26	7.48	4.74	2.66
1992-2001	12.94	15.58	8.09	8.73	6.73	4.56	2.51
1993-2002	9.34	11.58	8.75	9.67	7.29	4.37	2.46
1994-2003	11.07	14.79	7.97	8.01	6.40	4.18	2.37
1995-2004	12.07	16.39	9.52	9.78	7.20	3.90	2.43
1996-2005	9.07	13.62	7.53	7.60	5.69	3.64	2.52
1997-2006	8.42	13.48	7.72	7.83	5.80	3.60	2.44
1998-2007	5.91	10.58	6.69	7.26	5.96	3.54	2.68
1999-2008	-1.38	6.44	6.50	8.42	6.24	3.22	2.52
2000-2009	-0.95	6.30	7.65	7.69	6.17	2.76	2.52
2001-2010	1.41	9.63	7.61	6.64	5.64	2.18	2.34
2002-2011	2.92	7.05	8.30	8.83	5.76	1.80	2.48
2003-2012	7.10	10.42	7.76	7.42	4.65	1.64	2.41
2004-2013	7.41	9.29	6.42	5.81	4.01	1.54	2.38
2005-2014	7.67	7.77	7.23	7.30	4.09	1.42	2.12
2006-2015	7.31	6.79	6.51	6.42	4.13	1.13	1.90

Exhibit 2.8: Basic Series

Compound Annual Returns for 20-Year Holding Periods (% per annum)

20-Year Period	Large- Cap Stocks	Small- Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1926-1945	7.13	9.36	5.52	4.72	3.73	1.07	0.07
1927-1946	6.10	8.67	5.24	4.32	3.51	0.93	0.99
1928-1947	4.71	7.64	4.74	3.74	3.33	0.80	1.53
1929-1948	3.11	5.74	4.80	3.91	3.38	0.66	1.72
1930-1949	4.46	10.61	4.80	4.06	3.20	0.48	1.61
1931-1950	7.43	15.17	4.51	3.82	2.90	0.42	2.22
1932-1951	11.72	19.65	4.47	3.90	3.04	0.44	3.02
1933-1952	13.15	20.16	4.11	3.15	2.69	0.48	3.63
1934-1953	10.68	14.56	3.77	3.34	2.76	0.55	3.64
1935-1954	13.13	16.04	3.37	3.20	2.45	0.59	3.51
1936-1955	12.48	15.17	2.92	2.89	2.07	0.66	3.37
1937-1956	11.20	12.56	2.23	2.22	1.90	0.77	3.46
1938-1957	12.98	16.63	2.52	2.58	2.20	0.91	3.45
1939-1958	13.48	17.90	2.10	1.98	1.83	0.99	3.69
1940-1959	14.15	18.78	1.85	1.57	1.58	1.14	3.79
1941-1960	14.76	18.89	2.12	1.93	2.00	1.27	3.82
1942-1961	16.86	21.13	2.22	1.93	2.07	1.37	3.37
1943-1962	15.25	18.17	2.48	2.11	2.25	1.50	2.98
1944-1963	15.11	15.70	2.45	2.06	2.19	1.63	2.90
1945-1964	14.95	14.44	2.45	2.10	2.30	1.79	2.86
1946-1965	13.84	13.29	2.23	1.61	2.24	1.97	2.84
1947-1966	13.72	13.58	2.15	1.80	2.42	2.19	2.15
1948-1967	14.63	17.03	2.01	1.45	2.43	2.38	1.87
1949-1968	14.92	18.97	1.93	1.26	2.56	2.60	1.96
1950-1969	13.43	16.21	1.34	0.69	2.41	2.87	2.36
1951-1970	12.09	13.23	2.09	1.26	3.17	3.13	2.35
1952-1971	11.64	13.67	2.77	2.10	3.58	3.28	2.22
1953-1972	11.67	13.75	2.95	2.32	3.76	3.39	2.35
1954-1973	10.84	12.04	2.83	2.08	3.83	3.64	2.75
1955-1974	6.86	8.21	2.41	1.94	3.98	4.00	3.37
1956-1975	7.09	9.51	3.08	2.46	4.41	4.21	3.70
1957-1976	7.90	11.78	4.34	3.55	5.06	4.34	3.80
1958-1977	8.12	13.95	3.99	3.15	4.74	4.44	3.98
1959-1978	6.52	12.31	4.10	3.41	4.99	4.72	4.34
1960-1979	6.83	13.49	3.93	3.46	5.22	5.09	4.92
1961-1980	8.32	15.61	3.34	2.59	4.84	5.51	5.46
1962-1981	6.77	14.75	3.03	2.64	5.21	6.12	5.87
1963-1982	8.31	16.92	4.47	4.04	6.28	6.51	6.01
1964-1983	8.30	17.63	4.68	4.01	6.57	6.80	6.12
1965-1984	7.80	16.00	5.25	4.58	7.06	7.12	6.26
1966-1985	8.66	15.25	6.67	5.97	8.00	7.31	6.36
1967-1986	10.18	16.06	7.63	6.94	8.52	7.38	6.24
1968-1987	9.28	12.04	7.88	7.31	8.62	7.44	6.31
1969-1988	9.54	11.47	8.30	7.82	8.70	7.50	6.30
1970-1989	11.56	13.64	9.58	9.01	9.42	7.59	6.22
1971-1990	11.17	13.35	9.01	8.71	9.08	7.66	6.26
1972-1991	11.91	14.58	9.43	9.00	9.40	7.72	6.24
1973-1992	11.35	15.54	9.54	9.12	9.51	7.70	6.21
1974-1993	12.78	18.82	10.16	10.10	9.85	7.49	5.91
1975-1994	14.60	20.33	10.00	9.42	9.25	7.29	5.44
1976-1995	14.61	19.57	10.58	10.45	9.69	7.28	5.22
1977-1996	14.57	17.84	9.71	9.54	9.14	7.28	5.14

Exhibit 2.8: Basic Series

Compound Annual Returns for 20-Year Holding Periods (% per annum)

20-Year Period	Large- Cap Stocks	Small- Cap Stocks	Long-term Corp Bonds	Long-term Gov't Bonds	Inter-term Gov't Bonds	U.S. Treasury Bills	Inflation
1978-1997	16.66	17.71	10.29	10.39	9.51	7.29	4.89
1979-1998	17.76	16.04	10.86	11.14	9.85	7.17	4.52
1980-1999	17.88	15.46	10.66	10.69	9.53	6.89	4.00
1981-2000	15.68	13.33	11.49	11.99	9.97	6.62	3.57
1982-2001	15.24	13.76	12.13	12.09	9.88	6.09	3.21
1983-2002	12.71	11.57	10.99	11.12	9.15	5.65	3.13
1984-2003	12.98	12.35	10.94	11.16	8.89	5.26	3.04
1985-2004	13.22	13.69	10.54	10.82	8.30	4.83	3.00
1986-2005	11.94	12.76	9.41	9.74	7.37	4.59	2.98
1987-2006	11.80	13.23	8.60	8.61	6.78	4.53	3.06
1988-2007	11.82	13.48	8.75	9.27	7.14	4.49	3.04
1989-2008	8.43	9.78	8.65	10.03	7.48	4.25	2.82
1990-2009	8.21	10.61	8.00	8.24	6.69	3.83	2.73
1991-2010	9.14	13.49	8.28	8.44	6.56	3.45	2.50
1992-2011	7.81	11.23	8.19	8.78	6.24	3.17	2.49
1993-2012	8.22	11.00	8.25	8.54	5.96	3.00	2.44
1994-2013	9.22	12.01	7.19	6.90	5.20	2.85	2.37
1995-2014	9.85	12.00	8.37	8.53	5.63	2.66	2.28
1996-2015	8.19	10.15	7.02	7.01	4.91	2.38	2.21

Exhibit 2.9: Basic Series

Maximum and Minimum Values of Compound Returns (% per annum) for 1-, 5-, 10-, and 20-Year Holding Periods Using Data From 1926–2015

Series	Annual Returns				Times Positive (Out of 90 Years)	Times Highest Returning Asset
	Maximum Return	Year	Minimum Return	Year		
Large-Cap Stocks	53.99	1933	-43.34	1931	66	16
Small-Cap Stocks	142.87	1933	-58.01	1937	62	40
Long-term Corp Bonds	42.56	1982	-8.09	1969	71	6
Long-term Gov't Bonds	40.36	1982	-14.90	2009	66	12
Inter-term Gov't Bonds	29.10	1982	-5.14	1994	80	4
U.S. Treasury Bills	14.71	1981	-0.02	1938	89	6
Inflation	18.16	1946	-10.30	1932	80	6

Series	5-Year Rolling Period Returns				Times Positive (Out of 86 Periods)	Times Highest Returning Asset
	Maximum Return	5-year Period Ending	Minimum Return	5-year Period Ending		
Large-Cap Stocks	28.56	1999	-12.47	1932	74	24
Small-Cap Stocks	45.90	1945	-27.54	1932	74	45
Long-term Corp Bonds	22.51	1986	-2.22	1969	83	8
Long-term Gov't Bonds	21.62	1986	-2.14	1969	80	5
Inter-term Gov't Bonds	16.98	1986	0.96	1959	86	3
U.S. Treasury Bills	11.12	1983	0.03	2015	86	0
Inflation	10.06	1981	-5.42	1932	79	1

Series	10-Year Rolling Period Returns				Times Positive (Out of 81 Periods)	Times Highest Returning Asset
	Maximum Return	10-year Period Ending	Minimum Return	10-year Period Ending		
Large-Cap Stocks	20.06	1958	-1.38	2008	77	21
Small-Cap Stocks	30.38	1984	-5.70	1938	79	47
Long-term Corp Bonds	16.32	1991	0.98	1956	81	6
Long-term Gov't Bonds	15.56	1991	-0.07	1959	80	3
Inter-term Gov't Bonds	13.13	1991	1.25	1956	81	2
U.S. Treasury Bills	9.17	1987	0.15	1942	81	1
Inflation	8.67	1982	-2.57	1935	75	1

Series	20-Year Rolling Period Returns				Times Positive (Out of 71 Periods)	Times Highest Returning Asset
	Maximum Return	20-year Period Ending	Minimum Return	20-year Period Ending		
Large-Cap Stocks	17.88	1999	3.11	1948	71	9
Small-Cap Stocks	21.13	1961	5.74	1948	71	61
Long-term Corp Bonds	12.13	2001	1.34	1969	71	0
Long-term Gov't Bonds	12.09	2001	0.69	1969	71	1
Inter-term Gov't Bonds	9.97	2000	1.58	1959	71	0
U.S. Treasury Bills	7.72	1991	0.42	1950	71	0
Inflation	6.36	1985	0.07	1945	71	0

Exhibit 2.10: Portfolios

Maximum and Minimum Values of Compound Returns (% per annum) for 1-, 5-, 10-, and 20-Year Holding Periods Using Data From 1926–2015

Annual Returns

Annual Return	Maximum Return	Year	Minimum Return	Year	Arithmetic Annualized Mean	Times Positive (Out of 90 years)	% Positive in 90 years	Times Highest Returning Portfolio
100% Large Stocks	53.99	1933	-43.34	1931	11.95	66	73	55
90% Stocks/10%	49.03	1933	-39.73	1931	11.32	67	74	0
70% Stocks/30%	38.68	1933	-32.31	1931	10.09	69	77	0
50% Stocks/50%	34.71	1995	-24.70	1931	8.89	71	79	0
30% Stocks/70%	34.72	1982	-16.96	1931	7.72	72	80	0
10% Stocks/90%	38.48	1982	-11.23	2009	6.58	69	77	0
100% LT Gov't Bonds*	40.36	1982	-14.90	2009	6.02	66	73	35

5-Year Rolling Period Returns

Annual Return	Maximum Return	5-year Period Ending	Minimum Return	5-year Period Ending	Arithmetic Annualized Mean	Times Positive (Out of 86 Periods)	% Positive in 86 Periods	Times Highest Returning Portfolio
100% Large Stocks	28.56	1999	-12.47	1932	10.03	74	86	57
90% Stocks/10%	26.62	1999	-10.31	1932	9.75	78	91	1
70% Stocks/30%	22.75	1999	-6.31	1932	9.08	81	94	0
50% Stocks/50%	20.99	1986	-2.77	1932	8.27	81	94	3
30% Stocks/70%	21.30	1986	0.12	1969	7.34	86	100	2
10% Stocks/90%	21.53	1986	-1.38	1969	6.27	83	97	1
100% LT Gov't Bonds	21.62	1986	-2.14	1969	5.69	80	93	22

10-Year Rolling Period Returns

Annual Return	Maximum Return	10-year Period Ending	Minimum Return	10-year Period Ending	Arithmetic Annualized Mean	Times Positive (Out of 81 Periods)	% Positive in 81 Periods	Times Highest Returning Portfolio
100% Large Stocks	20.06	1958	-1.38	2008	10.39	77	95	52
90% Stocks/10%	18.52	1998	-0.25	2008	10.07	80	99	4
70% Stocks/30%	17.31	1991	1.74	1974	9.32	81	100	6
50% Stocks/50%	16.96	1991	1.98	1974	8.44	81	100	7
30% Stocks/70%	16.49	1991	2.13	1974	7.43	81	100	1
10% Stocks/90%	15.90	1991	1.81	1959	6.28	81	100	5
100% LT Gov't Bonds	15.56	1991	-0.07	1959	5.66	80	99	6

20-Year Rolling Period Returns

Annual Return	Maximum Return	20-year Period Ending	Minimum Return	20-year Period Ending	Arithmetic Annualized Mean	Times Positive (out of 71 Periods)	% Positive in 71 Periods	Times Highest Returning Portfolio
100% Large Stocks	17.88	1999	3.11	1948	11.12	71	100	59
90% Stocks/10%	17.28	1999	3.58	1948	10.70	71	100	1
70% Stocks/30%	16.04	1998	4.27	1948	9.77	71	100	5
50% Stocks/50%	14.75	1998	4.60	1948	8.72	71	100	4
30% Stocks/70%	13.38	1998	3.62	1974	7.55	71	100	1
10% Stocks/90%	12.53	2001	1.98	1969	6.27	71	100	0
100% LT Gov't Bonds	12.09	2001	0.69	1969	5.59	71	100	1

* LT = Long-term

Summary Statistics of Portfolio Total Returns

Exhibit 2.11 presents summary statistics of the annual total returns on each portfolio over the 1926–2015 period. The summary statistics presented are geometric mean, arithmetic mean, and standard deviation. As more fixed-income is added to the portfolio, the returns – as well as the standard deviation – tend to decrease. Moving from a 100% stock portfolio to a 70% stock and 30% bond portfolio decreases the geometric mean by 0.8% (10.0% – 9.2%), but also decreases the standard deviation by 5.7% (20.0% – 14.3%). This corresponds to the risk/return trade-off: large-cap stocks have a higher level of risk than long-term government bonds, and are rewarded accordingly.

A seemingly counter-intuitive result in Exhibit 2.11 to the risk/return trade-off is when the return and standard deviation of the 100% bond portfolio is compared to the return and standard deviation of (i) the 10% stock/90% bond portfolio, and (ii) the 30% stock/70% bond portfolio. In these cases, *adding* stocks both *increases* return and *decreases* standard deviation, when compared to a portfolio of 100% bonds. This obviously defies the risk/return trade-off, but highlights the benefits of *diversification*.

A portfolio's asset mix can change from its original percentages as a result of differing returns among the various asset classes held in the portfolio. Thus, asset allocation percentages can *change over time without the investor's input*. For example, if a hypothetical investor invests \$1.00 in stocks and \$1.00 in bonds, the portfolio that he holds is initially 50% stocks and 50% bonds. If the returns of stocks and bonds over the next year are 20% and 5%, respectively, the "stock" portion of his portfolio has now increased to \$1.20, and the "bond" portion of his portfolio has now increased to \$1.05. The investor's portfolio mix has also changed: it is now approximately 53.3% stocks ($\$1.20/(\$1.20 + \$1.05)$), and 46.7% bonds ($\$1.05/(\$1.20 + \$1.05)$).

Exhibits 2.11, 2.12, 2.13, and 2.14: Portfolios: Summary Statistics of Annual Returns
Always Rebalanced, Never Rebalanced, by Decade, and in the most recent 10-year period
(% per annum) (1926–2015)

Exhibit 2.11: Portfolio Summary Statistics of Annual Returns (Always Rebalanced) (% per annum)

Portfolio (Always Rebalanced)	Geometric Mean	Arithmetic Mean	Standard Deviation
100% Large Stocks	10.0	12.0	20.0
90% Stocks/10% Bonds	9.8	11.3	18.0
70% Stocks/30% Bonds	9.1	10.1	14.3
50% Stocks/50% Bonds	8.3	8.9	11.2
30% Stocks/70% Bonds	7.3	7.7	9.3
10% Stocks/90% Bonds	6.2	6.6	9.2
100% Long-term Gov't Bonds	5.6	6.0	10.0

Exhibit 2.12: Portfolio Summary Statistics of Annual Returns (Never Rebalanced) (% per annum)

Portfolio (Never Rebalanced)	Ending Portfolio Large-Cap Stocks (% of Portfolio 12/31/2015)	Ending Portfolio Bonds (% of Portfolio 12/31/2015)	Geometric Mean	Arithmetic Mean	Standard Deviation
100% Large Stocks	100.0	0.0	10.0	12.0	20.0
90% Stocks/10% Bonds	99.7	0.3	9.9	11.6	19.0
70% Stocks/30% Bonds	99.0	1.0	9.6	11.0	17.3
50% Stocks/50% Bonds	97.6	2.4	9.2	10.4	15.6
30% Stocks/70% Bonds	94.6	5.4	8.6	9.5	13.8
10% Stocks/90% Bonds	81.9	18.1	7.5	8.0	11.0
100% Long-term Gov't Bonds	0.0	100.0	5.6	6.0	10.0

Exhibit 2.13: Portfolio Summary Statistics of Annual Returns by Decade (Always Rebalanced) (% per annum)

Portfolio (Always Rebalanced)	1920s*	1930s	1940s	1950s	1960s	1970s	1980s	1990s	2000s	2010s**
100% Large Stocks	19.2	-0.1	9.2	19.4	7.8	5.9	17.6	18.2	-0.9	13.0
90% Stocks/10% Bonds	18.0	1.0	8.7	17.4	7.2	5.9	17.2	17.3	0.1	12.7
70% Stocks/30% Bonds	15.3	2.8	7.6	13.4	6.1	6.0	16.5	15.5	2.1	11.9
50% Stocks/50% Bonds	12.5	4.1	6.5	9.5	4.8	6.0	15.5	13.6	3.9	10.9
30% Stocks/70% Bonds	9.6	4.8	5.2	5.6	3.5	5.9	14.5	11.7	5.5	9.8
10% Stocks/90% Bonds	6.6	5.0	3.9	1.8	2.1	5.7	13.3	9.8	7.0	8.5
100% Long-term Gov't Bonds	5.0	4.9	3.2	-0.1	1.4	5.5	12.6	8.8	7.7	7.7

* Based on the period 1926–1929

** Based on the period 2010–2015

Exhibit 2.14: Portfolio Summary Statistics of Annual Returns 2006–2015 (Most Recent Decade) (% per annum)

Portfolio (Always Rebalanced)	2006–2015
100% Large Stocks	7.3
90% Stocks/10% Bonds	7.4
70% Stocks/30% Bonds	7.6
50% Stocks/50% Bonds	7.5
30% Stocks/70% Bonds	7.2
10% Stocks/90% Bonds	6.7
100% Long-term Gov't Bonds	6.4

Exhibit 2.15: Portfolio Annual Total Returns (%)
1926-2015

Year	100% Large Stocks	90/10	70/30	50/50	30/70	10/90	100% Long- term Gov't Bonds
1926	11.62	11.30	10.61	9.87	9.07	8.22	7.77
1927	37.49	34.45	28.49	22.69	17.06	11.60	8.93
1928	43.61	38.74	29.35	20.44	11.98	3.95	0.10
1929	-8.42	-6.76	-3.77	-1.19	0.97	2.71	3.42
1930	-24.90	-22.08	-16.33	-10.46	-4.48	1.59	4.66
1931	-43.34	-39.73	-32.31	-24.70	-16.96	-9.19	-5.31
1932	-8.19	-4.45	2.43	8.28	12.85	15.93	16.84
1933	53.99	49.03	38.68	27.89	16.80	5.56	-0.07
1934	-1.44	-0.13	2.38	4.76	6.99	9.05	10.03
1935	47.67	42.94	33.80	25.06	16.73	8.80	4.98
1936	33.92	31.15	25.69	20.35	15.12	10.02	7.52
1937	-35.03	-31.93	-25.44	-18.58	-11.34	-3.72	0.23
1938	31.12	29.24	24.93	19.99	14.51	8.61	5.53
1939	-0.41	0.65	2.51	4.00	5.09	5.77	5.94
1940	-9.78	-8.04	-4.65	-1.40	1.70	4.66	6.09
1941	-11.59	-10.33	-7.81	-5.30	-2.80	-0.31	0.93
1942	20.34	18.62	15.18	11.75	8.32	4.91	3.22
1943	25.90	23.43	18.54	13.73	9.00	4.37	2.08
1944	19.75	17.98	14.49	11.06	7.71	4.43	2.81
1945	36.44	33.72	28.39	23.18	18.11	13.16	10.73
1946	-8.07	-7.17	-5.42	-3.78	-2.23	-0.78	-0.10
1947	5.71	4.89	3.24	1.58	-0.10	-1.78	-2.62
1948	5.50	5.46	5.26	4.91	4.41	3.77	3.40
1949	18.79	17.55	15.07	12.60	10.13	7.68	6.45
1950	31.71	28.24	21.50	15.04	8.85	2.93	0.06
1951	24.02	20.97	15.05	9.36	3.88	-1.38	-3.93
1952	18.37	16.60	13.10	9.64	6.22	2.83	1.16
1953	-0.99	-0.50	0.47	1.41	2.32	3.21	3.64
1954	52.62	47.50	37.65	28.33	19.51	11.18	7.19
1955	31.56	27.98	21.02	14.32	7.89	1.70	-1.29
1956	6.56	5.42	3.08	0.68	-1.79	-4.31	-5.59
1957	-10.78	-8.99	-5.39	-1.75	1.92	5.61	7.46
1958	43.36	37.57	26.60	16.38	6.89	-1.93	-6.09
1959	11.96	10.49	7.59	4.72	1.90	-0.88	-2.26
1960	0.47	1.83	4.53	7.21	9.86	12.48	13.78
1961	26.89	24.10	18.65	13.38	8.29	3.37	0.97
1962	-8.73	-7.11	-3.90	-0.74	2.37	5.40	6.89
1963	22.80	20.52	16.03	11.66	7.40	3.25	1.21
1964	16.48	15.13	12.46	9.84	7.27	4.75	3.51
1965	12.45	11.26	8.89	6.53	4.19	1.86	0.71
1966	-10.06	-8.72	-6.02	-3.29	-0.53	2.25	3.65
1967	23.98	20.28	13.14	6.36	-0.10	-6.23	-9.18
1968	11.06	9.98	7.79	5.54	3.25	0.92	-0.26
1969	-8.50	-8.08	-7.28	-6.56	-5.91	-5.33	-5.07
1970	3.86	4.78	6.57	8.27	9.87	11.39	12.11
1971	14.30	14.29	14.21	14.04	13.78	13.44	13.23
1972	18.99	17.62	14.90	12.22	9.57	6.97	5.69
1973	-14.69	-13.31	-10.57	-7.84	-5.12	-2.44	-1.11
1974	-26.47	-23.66	-17.87	-11.82	-5.53	1.00	4.35
1975	37.23	34.30	28.51	22.84	17.29	11.86	9.20

Exhibit 2.15: Portfolio Annual Total Returns (%)

1926-2015

Year	100% Large Stocks	90/10	70/30	50/50	30/70	10/90	100% Long- term Gov't Bonds
1976	23.93	23.28	21.93	20.52	19.06	17.54	16.75
1977	-7.16	-6.50	-5.20	-3.90	-2.61	-1.33	-0.69
1978	6.57	5.86	4.40	2.88	1.30	-0.34	-1.18
1979	18.61	16.52	12.40	8.39	4.47	0.64	-1.23
1980	32.50	28.71	21.19	13.80	6.57	-0.49	-3.95
1981	-4.92	-4.16	-2.69	-1.30	0.02	1.27	1.86
1982	21.55	23.42	27.19	30.95	34.72	38.48	40.36
1983	22.56	20.24	15.68	11.25	6.92	2.71	0.65
1984	6.27	7.26	9.18	11.05	12.87	14.62	15.48
1985	31.73	31.72	31.65	31.53	31.35	31.11	30.97
1986	18.67	19.34	20.64	21.86	23.00	24.04	24.53
1987	5.25	5.07	4.24	2.83	0.93	-1.40	-2.71
1988	16.61	15.92	14.55	13.16	11.77	10.37	9.67
1989	31.69	30.37	27.70	25.00	22.26	19.50	18.11
1990	-3.10	-2.15	-0.26	1.61	3.46	5.28	6.18
1991	30.47	29.41	27.24	25.03	22.77	20.47	19.30
1992	7.62	7.69	7.81	7.91	7.98	8.04	8.05
1993	10.08	10.90	12.53	14.16	15.80	17.43	18.24
1994	1.32	0.40	-1.42	-3.25	-5.06	-6.87	-7.77
1995	37.58	37.02	35.88	34.71	33.51	32.29	31.67
1996	22.96	20.41	15.41	10.56	5.85	1.29	-0.93
1997	33.36	31.59	28.06	24.55	21.05	17.58	15.85
1998	28.58	27.33	24.60	21.59	18.33	14.86	13.06
1999	21.04	17.75	11.36	5.23	-0.63	-6.25	-8.96
2000	-9.10	-6.30	-0.53	5.46	11.70	18.16	21.48
2001	-11.89	-10.18	-6.85	-3.64	-0.58	2.32	3.70
2002	-22.10	-18.45	-10.90	-3.04	5.12	13.54	17.84
2003	28.68	25.86	20.27	14.77	9.36	4.06	1.45
2004	10.88	10.70	10.29	9.84	9.34	8.80	8.51
2005	4.91	5.28	5.96	6.58	7.12	7.60	7.81
2006	15.79	14.30	11.33	8.40	5.49	2.61	1.19
2007	5.49	6.03	7.03	7.95	8.79	9.54	9.88
2008	-37.00	-32.14	-21.55	-9.72	3.43	18.02	25.87
2009	26.46	21.86	12.97	4.49	-3.58	-11.23	-14.90
2010	15.06	14.97	14.52	13.70	12.53	11.02	10.14
2011	2.11	4.69	9.81	14.88	19.85	24.72	27.10
2012	16.00	14.86	12.48	10.00	7.43	4.78	3.43
2013	32.39	27.14	17.16	7.85	-0.84	-8.94	-12.78
2014	13.69	14.80	17.03	19.24	21.44	23.62	24.71
2015	1.38	1.35	1.18	0.84	0.36	-0.28	-0.65

2016 SBBI Yearbook

Appendix B-1 (3)

Appendix B-1

Large-Capitalization Stocks: Total Return Index
From 1926 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr End	Index
1986	280.599	301.573	318.399	314.813	331.562	337.165	318.307	341.911	313.645	331.733	339.795	331.124	1986	331.124
1987	375.712	390.558	401.827	398.259	401.712	421.998	443.376	459.920	449.837	352.959	323.879	348.510	1987	348.510
1988	363.169	380.098	368.356	372.430	375.651	392.890	391.400	378.113	394.222	405.199	399.424	406.392	1988	406.392
1989	436.151	425.282	435.203	457.799	476.321	473.619	516.383	526.478	524.342	512.167	522.612	535.162	1989	535.162
1990	499.233	505.664	519.063	506.113	555.462	551.715	549.946	500.236	475.891	473.865	504.496	518.549	1990	518.549
1991	541.132	579.832	593.873	595.278	620.959	592.510	620.127	634.819	624.195	632.587	607.099	676.530	1991	676.530
1992	663.923	672.521	659.441	678.803	682.131	671.983	699.435	685.120	693.171	695.566	719.250	728.077	1992	728.077
1993	734.164	744.170	759.871	741.505	761.340	763.570	760.498	789.355	783.301	799.504	791.883	801.458	1993	801.458
1994	828.705	806.212	771.064	780.952	793.768	774.311	799.737	832.526	812.168	830.414	800.172	812.041	1994	812.041
1995	833.100	865.567	891.107	917.348	954.012	976.171	1,008.543	1,011.079	1,053.749	1,049.983	1,096.075	1,117.188	1995	1,117.188
1996	1,155.212	1,165.923	1,177.145	1,194.501	1,225.306	1,229.980	1,175.640	1,200.439	1,268.005	1,302.978	1,401.466	1,373.696	1996	1,373.696
1997	1,459.519	1,470.958	1,410.518	1,494.724	1,585.729	1,656.772	1,788.598	1,688.397	1,780.865	1,721.388	1,801.076	1,832.007	1997	1,832.007
1998	1,852.271	1,985.866	2,087.559	2,108.561	2,072.320	2,156.496	2,133.532	1,825.071	1,941.987	2,099.951	2,227.225	2,355.569	1998	2,355.569
1999	2,454.070	2,377.800	2,472.933	2,568.698	2,508.042	2,647.232	2,564.573	2,551.885	2,481.928	2,638.986	2,692.631	2,851.217	1999	2,851.217
2000	2,707.964	2,656.704	2,916.606	2,828.858	2,770.818	2,839.127	2,794.740	2,968.334	2,811.626	2,799.739	2,579.009	2,591.631	2000	2,591.631
2001	2,683.580	2,438.886	2,284.382	2,461.903	2,478.396	2,418.076	2,394.272	2,244.386	2,063.147	2,102.489	2,263.763	2,283.594	2001	2,283.594
2002	2,250.269	2,206.872	2,289.871	2,151.041	2,135.194	1,983.104	1,828.513	1,840.518	1,640.492	1,784.881	1,889.937	1,778.908	2002	1,778.908
2003	1,732.307	1,706.315	1,722.883	1,864.797	1,963.048	1,988.090	2,023.143	2,062.598	2,040.695	2,156.136	2,175.106	2,289.179	2003	2,289.179
2004	2,331.197	2,363.599	2,327.941	2,291.397	2,322.841	2,368.008	2,289.635	2,298.897	2,323.795	2,359.295	2,454.757	2,538.289	2004	2,538.289
2005	2,476.418	2,528.532	2,483.757	2,436.651	2,514.181	2,517.750	2,611.382	2,587.555	2,608.512	2,565.027	2,662.041	2,662.968	2005	2,662.968
2006	2,733.478	2,740.894	2,775.012	2,812.274	2,731.333	2,735.036	2,751.907	2,817.383	2,889.987	2,984.160	3,040.907	3,083.564	2006	3,083.564
2007	3,130.198	3,068.975	3,103.301	3,240.763	3,353.849	3,298.131	3,195.872	3,243.779	3,365.092	3,418.621	3,275.700	3,252.974	2007	3,252.974
2008	3,057.856	2,958.519	2,945.744	3,089.211	3,129.224	2,865.419	2,841.332	2,882.431	2,625.585	2,184.624	2,027.867	2,049.444	2008	2,049.444
2009	1,876.704	1,676.877	1,823.763	1,998.314	2,110.086	2,114.271	2,274.189	2,356.297	2,444.222	2,398.816	2,542.705	2,591.819	2009	2,591.819
2010	2,498.581	2,575.980	2,731.428	2,774.551	2,553.001	2,419.356	2,588.863	2,471.991	2,692.603	2,795.054	2,795.413	2,982.234	2010	2,982.234
2011	3,052.918	3,157.508	3,158.764	3,252.312	3,215.497	3,161.897	3,097.601	2,929.334	2,723.405	3,021.054	3,014.378	3,045.212	2011	3,045.212
2012	3,181.685	3,319.267	3,428.502	3,406.981	3,202.219	3,334.157	3,380.466	3,456.603	3,545.928	3,480.455	3,500.645	3,532.552	2012	3,532.552
2013	3,715.521	3,765.959	3,907.195	3,982.473	4,075.631	4,020.900	4,225.500	4,103.123	4,231.795	4,426.321	4,561.209	4,676.681	2013	4,676.681
2014	4,514.989	4,721.521	4,761.209	4,796.404	4,908.995	5,010.403	4,941.305	5,138.982	5,066.915	5,190.675	5,330.276	5,316.849	2014	5,316.849
2015	5,157.241	5,453.636	5,367.389	5,418.879	5,488.562	5,382.314	5,495.080	5,163.541	5,035.777	5,460.566	5,476.805	5,390.425	2015	5,390.425

2016 SBBI Yearbook

Appendix B-5 (15)

Appendix B-5

Long-term Government Bonds: Total Return Index

From 1926 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr End	Index
1986	11.009	12.270	13.215	13.109	12.447	13.210	13.068	13.720	13.034	13.410	13.769	13.745	1986	13.745
1987	13.966	14.247	13.930	13.271	13.132	13.260	13.024	12.810	12.337	13.106	13.154	13.372	1987	13.372
1988	14.263	14.337	13.897	13.675	13.536	14.035	13.797	13.876	14.355	14.796	14.506	14.665	1988	14.665
1989	14.963	14.695	14.875	15.111	15.717	16.582	16.977	16.537	16.569	17.198	17.332	17.322	1989	17.322
1990	16.728	16.686	16.613	16.278	16.954	17.344	17.530	16.796	16.992	17.358	18.056	18.392	1990	18.392
1991	18.632	18.689	18.760	19.023	19.024	18.904	19.202	19.855	20.458	20.569	20.738	21.942	1991	21.942
1992	21.231	21.339	21.140	21.173	21.687	22.121	23.001	23.155	23.584	23.117	23.140	23.709	1992	23.709
1993	24.374	25.237	25.290	25.472	25.591	26.739	27.251	28.433	28.448	28.722	27.979	28.034	1993	28.034
1994	28.755	27.462	26.378	25.981	25.767	25.508	26.435	26.209	25.342	25.280	25.447	25.856	1994	25.856
1995	26.561	27.322	27.572	28.039	30.255	30.675	30.161	30.873	31.413	32.337	33.143	34.044	1995	34.044
1996	34.007	32.366	31.687	31.163	30.994	31.622	31.678	31.237	32.142	33.440	34.612	33.727	1996	33.727
1997	33.459	33.476	32.633	33.465	33.783	34.448	36.603	35.441	36.560	37.807	38.366	39.074	1997	39.074
1998	39.856	39.570	39.668	39.771	40.497	41.421	41.256	43.173	44.876	43.896	44.320	44.178	1998	44.178
1999	44.713	42.390	42.355	42.444	41.660	41.337	41.012	40.803	41.147	41.099	40.849	40.218	1999	40.218
2000	41.135	42.220	43.768	43.437	43.200	44.254	45.018	46.100	45.376	46.227	47.699	48.856	2000	48.856
2001	48.882	49.816	49.447	47.899	48.079	48.488	50.309	51.343	51.758	54.160	51.607	50.662	2001	50.662
2002	51.361	51.951	49.686	51.721	51.798	52.769	54.368	56.888	59.258	57.517	56.817	59.699	2002	59.699
2003	59.065	61.011	60.186	60.798	64.397	63.406	57.178	58.129	61.306	59.573	59.732	60.564	2003	60.564
2004	61.699	63.117	64.007	60.244	59.939	60.666	61.609	64.040	64.657	65.649	64.115	65.717	2004	65.717
2005	67.691	66.826	66.348	68.820	70.862	72.047	69.973	72.302	69.860	68.489	69.010	70.852	2005	70.852
2006	70.018	71.687	67.821	66.148	66.213	66.819	68.148	70.186	71.383	71.932	73.425	71.694	2006	71.694
2007	70.961	73.335	72.272	72.887	71.428	70.782	72.790	74.235	74.323	75.476	79.009	78.779	2007	78.779
2008	80.460	80.608	81.460	79.111	77.812	79.526	79.330	81.251	82.164	79.016	90.416	99.161	2008	99.161
2009	88.012	87.518	93.129	87.081	84.921	85.629	85.790	87.769	89.314	87.790	89.620	84.383	2009	84.383
2010	86.608	86.881	85.328	87.921	91.762	95.851	96.085	102.831	101.255	98.041	96.696	92.942	2010	92.942
2011	91.121	92.152	92.095	93.929	97.261	95.516	99.545	108.129	115.743	112.200	115.022	118.130	2011	118.130
2012	118.153	115.832	112.337	116.937	124.452	122.763	125.797	124.936	123.107	122.933	124.699	122.180	2012	122.180
2013	118.128	119.478	118.739	123.222	115.477	112.184	110.242	109.373	110.043	111.454	108.829	106.571	2013	106.571
2014	112.409	113.239	113.951	116.016	119.248	118.944	119.618	124.031	121.919	125.570	129.157	132.900	2014	132.900
2015	142.323	134.875	136.717	133.295	131.172	127.260	131.448	131.603	133.898	133.183	132.321	132.032	2015	132.032

2016 SBBI Yearbook

Appendix B-9 (25)

Appendix B-9U.S. Treasury Bills: Total Return Index
From 1926 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr End	Index
1925												1.000	1925	1.000
1926	1.003	1.006	1.009	1.013	1.013	1.016	1.018	1.021	1.023	1.027	1.030	1.033	1926	1.033
1927	1.035	1.038	1.041	1.044	1.047	1.049	1.053	1.055	1.058	1.060	1.063	1.065	1927	1.065
1928	1.068	1.071	1.074	1.077	1.080	1.084	1.087	1.091	1.093	1.098	1.102	1.103	1928	1.103
1929	1.107	1.111	1.114	1.118	1.123	1.129	1.133	1.137	1.141	1.147	1.151	1.155	1929	1.155
1930	1.157	1.160	1.164	1.167	1.170	1.173	1.175	1.176	1.179	1.180	1.181	1.183	1930	1.183
1931	1.185	1.185	1.187	1.188	1.189	1.190	1.190	1.191	1.191	1.192	1.194	1.196	1931	1.196
1932	1.198	1.201	1.203	1.205	1.205	1.206	1.206	1.206	1.207	1.207	1.207	1.207	1932	1.207
1933	1.207	1.207	1.208	1.209	1.209	1.210	1.210	1.210	1.210	1.210	1.211	1.211	1933	1.211
1934	1.211	1.212	1.212	1.212	1.212	1.212	1.212	1.212	1.212	1.213	1.213	1.213	1934	1.213
1935	1.213	1.213	1.213	1.213	1.214	1.214	1.214	1.214	1.214	1.214	1.215	1.215	1935	1.215
1936	1.215	1.215	1.215	1.216	1.216	1.216	1.216	1.216	1.217	1.217	1.217	1.217	1936	1.217
1937	1.217	1.217	1.218	1.218	1.219	1.219	1.219	1.220	1.220	1.220	1.221	1.221	1937	1.221
1938	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1938	1.221
1939	1.220	1.221	1.220	1.220	1.220	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1939	1.221
1940	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1940	1.221
1941	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.221	1.222	1941	1.222
1942	1.222	1.222	1.222	1.222	1.222	1.223	1.223	1.223	1.224	1.224	1.225	1.225	1942	1.225
1943	1.225	1.226	1.226	1.226	1.227	1.227	1.227	1.228	1.228	1.228	1.229	1.229	1943	1.229
1944	1.229	1.230	1.230	1.230	1.231	1.231	1.231	1.232	1.232	1.233	1.233	1.233	1944	1.233
1945	1.233	1.234	1.234	1.234	1.235	1.235	1.235	1.236	1.236	1.237	1.237	1.237	1945	1.237
1946	1.238	1.238	1.238	1.239	1.239	1.239	1.240	1.240	1.240	1.241	1.241	1.242	1946	1.242
1947	1.242	1.242	1.243	1.243	1.243	1.244	1.244	1.244	1.245	1.246	1.247	1.248	1947	1.248
1948	1.249	1.250	1.251	1.252	1.253	1.254	1.255	1.256	1.256	1.257	1.257	1.258	1948	1.258
1949	1.259	1.260	1.262	1.263	1.264	1.265	1.266	1.267	1.269	1.270	1.271	1.272	1949	1.272
1950	1.273	1.274	1.275	1.276	1.278	1.279	1.280	1.281	1.283	1.284	1.286	1.287	1950	1.287
1951	1.289	1.290	1.291	1.293	1.295	1.296	1.298	1.300	1.301	1.303	1.305	1.306	1951	1.306
1952	1.308	1.310	1.311	1.313	1.314	1.316	1.318	1.320	1.322	1.324	1.326	1.328	1952	1.328
1953	1.330	1.332	1.334	1.337	1.339	1.341	1.343	1.345	1.348	1.349	1.350	1.352	1953	1.352
1954	1.354	1.355	1.356	1.357	1.357	1.358	1.359	1.360	1.361	1.362	1.363	1.364	1954	1.364
1955	1.365	1.366	1.367	1.369	1.371	1.372	1.373	1.376	1.378	1.380	1.383	1.385	1955	1.385

Appendix B-9

U.S. Treasury Bills: Total Return Index
From 1926 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr End	Index
1956	1.388	1.391	1.393	1.396	1.399	1.402	1.405	1.407	1.410	1.413	1.416	1.419	1956	1.419
1957	1.423	1.426	1.430	1.433	1.437	1.441	1.445	1.448	1.452	1.456	1.460	1.464	1957	1.464
1958	1.468	1.470	1.471	1.472	1.474	1.474	1.475	1.476	1.479	1.481	1.483	1.486	1958	1.486
1959	1.489	1.492	1.496	1.499	1.502	1.505	1.509	1.512	1.517	1.521	1.525	1.530	1959	1.530
1960	1.535	1.540	1.545	1.548	1.552	1.556	1.558	1.561	1.563	1.567	1.569	1.571	1960	1.571
1961	1.574	1.576	1.579	1.582	1.585	1.588	1.591	1.593	1.596	1.599	1.601	1.604	1961	1.604
1962	1.608	1.612	1.615	1.618	1.622	1.626	1.630	1.634	1.637	1.641	1.645	1.648	1962	1.648
1963	1.652	1.656	1.660	1.664	1.668	1.672	1.677	1.681	1.685	1.690	1.695	1.700	1963	1.700
1964	1.705	1.709	1.715	1.720	1.724	1.729	1.734	1.739	1.744	1.749	1.754	1.760	1964	1.760
1965	1.765	1.770	1.776	1.782	1.787	1.794	1.799	1.805	1.811	1.817	1.823	1.829	1965	1.829
1966	1.836	1.842	1.849	1.856	1.863	1.870	1.877	1.885	1.892	1.901	1.908	1.916	1966	1.916
1967	1.924	1.931	1.939	1.945	1.951	1.957	1.963	1.969	1.975	1.983	1.990	1.997	1967	1.997
1968	2.005	2.012	2.020	2.029	2.038	2.046	2.056	2.065	2.074	2.083	2.092	2.101	1968	2.101
1969	2.112	2.121	2.131	2.143	2.153	2.164	2.175	2.186	2.200	2.213	2.225	2.239	1969	2.239
1970	2.252	2.266	2.279	2.291	2.303	2.316	2.328	2.341	2.353	2.364	2.375	2.385	1970	2.385
1971	2.394	2.402	2.409	2.416	2.423	2.432	2.442	2.453	2.462	2.471	2.480	2.490	1971	2.490
1972	2.497	2.503	2.510	2.517	2.525	2.532	2.540	2.547	2.556	2.566	2.575	2.585	1972	2.585
1973	2.596	2.607	2.619	2.633	2.646	2.660	2.677	2.695	2.714	2.732	2.747	2.764	1973	2.764
1974	2.782	2.798	2.813	2.835	2.856	2.873	2.893	2.911	2.934	2.949	2.965	2.986	1974	2.986
1975	3.003	3.016	3.028	3.042	3.055	3.067	3.082	3.097	3.113	3.131	3.144	3.159	1975	3.159
1976	3.174	3.184	3.197	3.210	3.222	3.237	3.252	3.265	3.280	3.293	3.306	3.319	1976	3.319
1977	3.331	3.343	3.356	3.368	3.381	3.394	3.408	3.423	3.438	3.455	3.472	3.489	1977	3.489
1978	3.506	3.522	3.541	3.560	3.578	3.597	3.618	3.638	3.660	3.685	3.711	3.740	1978	3.740
1979	3.769	3.796	3.827	3.858	3.889	3.921	3.951	3.981	4.014	4.049	4.089	4.128	1979	4.128
1980	4.161	4.198	4.248	4.302	4.336	4.363	4.386	4.414	4.447	4.489	4.532	4.592	1980	4.592
1981	4.639	4.689	4.746	4.797	4.852	4.917	4.978	5.042	5.105	5.166	5.221	5.267	1981	5.267
1982	5.309	5.358	5.411	5.472	5.530	5.583	5.641	5.684	5.713	5.747	5.783	5.822	1982	5.822
1983	5.862	5.899	5.936	5.978	6.020	6.060	6.105	6.151	6.198	6.245	6.289	6.335	1983	6.335
1984	6.383	6.428	6.475	6.528	6.579	6.629	6.683	6.738	6.796	6.864	6.914	6.959	1984	6.959
1985	7.004	7.044	7.088	7.138	7.186	7.225	7.271	7.311	7.355	7.403	7.448	7.496	1985	7.496

2016 SBBI Yearbook

Appendix B-9 (27)

Appendix B-9

U.S. Treasury Bills: Total Return Index

From 1926 to 2015

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yr End	Index
1986	7.538	7.578	7.623	7.663	7.700	7.741	7.781	7.817	7.852	7.889	7.919	7.958	1986	7.958
1987	7.991	8.025	8.063	8.099	8.129	8.169	8.206	8.245	8.282	8.331	8.360	8.393	1987	8.393
1988	8.418	8.456	8.493	8.532	8.576	8.617	8.661	8.712	8.766	8.819	8.869	8.926	1988	8.926
1989	8.975	9.030	9.090	9.152	9.224	9.289	9.354	9.423	9.485	9.549	9.614	9.673	1989	9.673
1990	9.728	9.783	9.846	9.914	9.981	10.043	10.111	10.178	10.238	10.308	10.366	10.429	1990	10.429
1991	10.483	10.533	10.579	10.635	10.685	10.730	10.782	10.832	10.881	10.928	10.970	11.012	1991	11.012
1992	11.049	11.081	11.118	11.154	11.185	11.221	11.255	11.285	11.314	11.340	11.366	11.398	1992	11.398
1993	11.425	11.450	11.479	11.506	11.531	11.561	11.588	11.617	11.647	11.673	11.702	11.728	1993	11.728
1994	11.758	11.783	11.814	11.846	11.884	11.921	11.954	11.998	12.042	12.088	12.132	12.186	1994	12.186
1995	12.237	12.286	12.342	12.397	12.464	12.522	12.579	12.638	12.692	12.752	12.806	12.868	1995	12.868
1996	12.923	12.974	13.025	13.084	13.140	13.192	13.252	13.306	13.365	13.421	13.476	13.538	1996	13.538
1997	13.599	13.652	13.710	13.769	13.837	13.888	13.948	14.005	14.067	14.127	14.182	14.250	1997	14.250
1998	14.311	14.367	14.423	14.485	14.544	14.603	14.662	14.725	14.792	14.840	14.886	14.942	1998	14.942
1999	14.994	15.048	15.112	15.168	15.219	15.280	15.338	15.397	15.457	15.517	15.573	15.641	1999	15.641
2000	15.706	15.774	15.848	15.920	16.001	16.064	16.141	16.223	16.305	16.397	16.480	16.563	2000	16.563
2001	16.652	16.715	16.784	16.850	16.905	16.952	17.004	17.056	17.103	17.142	17.172	17.197	2001	17.197
2002	17.221	17.243	17.266	17.293	17.318	17.340	17.367	17.391	17.416	17.440	17.460	17.480	2002	17.480
2003	17.497	17.512	17.530	17.547	17.563	17.580	17.592	17.604	17.619	17.631	17.644	17.659	2003	17.659
2004	17.671	17.682	17.697	17.711	17.722	17.737	17.754	17.774	17.794	17.814	17.842	17.871	2004	17.871
2005	17.900	17.930	17.968	18.005	18.048	18.089	18.132	18.186	18.238	18.288	18.345	18.403	2005	18.403
2006	18.468	18.530	18.598	18.664	18.745	18.819	18.894	18.974	19.051	19.128	19.209	19.287	2006	19.287
2007	19.372	19.447	19.529	19.615	19.694	19.773	19.851	19.934	19.998	20.063	20.131	20.186	2007	20.186
2008	20.229	20.256	20.291	20.326	20.363	20.398	20.429	20.455	20.486	20.503	20.509	20.509	2008	20.509
2009	20.509	20.512	20.515	20.518	20.518	20.520	20.522	20.525	20.527	20.527	20.527	20.529	2009	20.529
2010	20.529	20.529	20.531	20.533	20.535	20.538	20.541	20.544	20.546	20.549	20.551	20.553	2010	20.553
2011	20.555	20.557	20.559	20.560	20.560	20.561	20.560	20.562	20.562	20.562	20.562	20.562	2011	20.562
2012	20.562	20.563	20.564	20.564	20.565	20.566	20.567	20.568	20.569	20.571	20.572	20.574	2012	20.574
2013	20.575	20.575	20.576	20.577	20.577	20.577	20.577	20.578	20.578	20.578	20.579	20.579	2013	20.579
2014	20.580	20.581	20.581	20.581	20.582	20.582	20.582	20.582	20.582	20.583	20.582	20.583	2014	20.583
2015	20.583	20.583	20.583	20.584	20.584	20.584	20.583	20.584	20.584	20.584	20.584	20.586	2015	20.586

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MERGENT BOND RECORD

June 2016

Corporate Bond Yield Averages

	AV. CORP.	CORPORATE BY RATINGS				CORPORATE BY GROUPS			PUBLIC UTILITY BONDS				INDUSTRIAL BONDS				RAILROAD BONDS						
		Aaa	Aa	A	Baa	P.U.	IND.	R.R.	Aaa	Aa	A	Baa	Aaa	Aa	A	Baa	Aaa	Aa	A	Baa			
2010																							
Jan.	5.76	5.26	5.50	5.76	6.25	5.83	5.69	---	Jan.	---	5.55	5.77	6.16	Jan.	5.26	5.44	5.73	6.33	Jan.	---	---	---	---
Feb.	5.86	5.35	5.62	5.84	6.34	5.94	5.79	---	Feb.	---	5.69	5.87	6.25	Feb.	5.35	5.55	5.80	6.43	Feb.	---	---	---	---
Mar.	5.81	5.27	5.57	5.80	6.27	5.90	5.71	---	Mar.	---	5.64	5.84	6.22	Mar.	5.27	5.49	5.75	6.32	Mar.	---	---	---	---
Apr.	5.80	5.29	5.57	5.78	6.25	5.87	5.71	---	Apr.	---	5.62	5.81	6.19	Apr.	5.29	5.50	5.74	6.32	Apr.	---	---	---	---
May	5.52	4.96	5.25	5.49	6.05	5.59	5.44	---	May	---	5.29	5.50	5.97	May	4.96	5.19	5.47	6.13	May	---	---	---	---
June	5.52	4.88	5.16	5.44	6.23	5.62	5.42	---	June	---	5.22	5.46	6.18	June	4.88	5.11	5.42	6.28	June	---	---	---	---
July	5.32	4.72	4.96	5.25	6.01	5.41	5.23	---	July	---	4.99	5.26	5.98	July	4.72	4.92	5.23	6.04	July	---	---	---	---
Aug.	5.05	4.49	4.72	5.00	5.66	5.10	4.98	---	Aug.	---	4.75	5.01	5.55	Aug.	4.49	4.68	4.98	5.77	Aug.	---	---	---	---
Sept.	5.05	4.53	4.72	5.01	5.66	5.10	5.00	---	Sept.	---	4.74	5.01	5.53	Sept.	4.53	4.70	5.00	5.78	Sept.	---	---	---	---
Oct.	5.15	4.68	4.83	5.09	5.72	5.20	5.08	---	Oct.	---	4.89	5.10	5.62	Oct.	4.68	4.77	5.07	5.81	Oct.	---	---	---	---
Nov.	5.37	4.87	5.07	5.33	5.92	5.45	5.29	---	Nov.	---	5.12	5.37	5.85	Nov.	4.87	5.02	5.29	5.99	Nov.	---	---	---	---
Dec.	5.55	5.02	5.26	5.52	6.10	5.64	5.46	---	Dec.	---	5.32	5.56	6.04	Dec.	5.02	5.19	5.47	6.15	Dec.	---	---	---	---
2011																							
Jan.	5.56	5.04	5.26	5.53	6.09	5.64	5.46	---	Jan.	---	5.29	5.57	6.06	Jan.	5.04	5.22	5.48	6.11	Jan.	---	---	---	---
Feb.	5.66	5.22	5.37	5.64	6.15	5.73	5.58	---	Feb.	---	5.42	5.68	6.10	Feb.	5.22	5.31	5.59	6.19	Feb.	---	---	---	---
Mar.	5.55	5.13	5.28	5.52	6.03	5.62	5.48	---	Mar.	---	5.33	5.56	5.97	Mar.	5.13	5.22	5.48	6.09	Mar.	---	---	---	---
Apr.	5.56	5.16	5.29	5.52	6.02	5.62	5.49	---	Apr.	---	5.32	5.55	5.98	Apr.	5.16	5.25	5.48	6.06	Apr.	---	---	---	---
May	5.33	4.96	5.06	5.29	5.78	5.38	5.27	---	May	---	5.08	5.32	5.74	May	4.96	5.04	5.26	5.81	May	---	---	---	---
June	5.30	4.99	5.04	5.26	5.75	5.33	5.27	---	June	---	5.04	5.26	5.67	June	4.99	5.02	5.25	5.82	June	---	---	---	---
July	5.30	4.93	5.03	5.26	5.76	5.34	5.25	---	July	---	5.05	5.27	5.70	July	4.93	4.99	5.25	5.81	July	---	---	---	---
Aug.	4.79	4.37	4.47	4.74	5.36	4.78	4.79	---	Aug.	---	4.44	4.69	5.22	Aug.	4.37	4.50	4.79	5.49	Aug.	---	---	---	---
Sept.	4.60	4.09	4.23	4.54	5.27	4.61	4.58	---	Sept.	---	4.24	4.48	5.11	Sept.	4.09	4.21	4.59	5.42	Sept.	---	---	---	---
Oct.	4.60	3.98	4.16	4.54	5.37	4.66	4.54	---	Oct.	---	4.21	4.52	5.24	Oct.	3.98	4.11	4.56	5.50	Oct.	---	---	---	---
Nov.	4.39	3.87	3.97	4.34	5.14	4.37	4.41	---	Nov.	---	3.92	4.25	4.93	Nov.	3.87	4.01	4.43	5.34	Nov.	---	---	---	---
Dec.	4.47	3.93	4.03	4.40	5.25	4.47	4.47	---	Dec.	---	4.00	4.33	5.07	Dec.	3.93	4.06	4.46	5.43	Dec.	---	---	---	---
2012																							
Jan.	4.45	3.85	4.01	4.39	5.23	4.48	4.41	---	Jan.	---	4.03	4.34	5.06	Jan.	3.85	3.98	4.43	5.39	Jan.	---	---	---	---
Feb.	4.42	3.85	3.99	4.39	5.14	4.47	4.37	---	Feb.	---	4.02	4.36	5.02	Feb.	3.85	3.96	4.41	5.26	Feb.	---	---	---	---
Mar.	4.54	3.99	4.14	4.51	5.23	4.59	4.50	---	Mar.	---	4.16	4.48	5.13	Mar.	3.99	4.12	4.53	5.33	Mar.	---	---	---	---
Apr.	4.49	3.96	4.08	4.44	5.19	4.53	4.44	---	Apr.	---	4.10	4.40	5.11	Apr.	3.96	4.06	4.48	5.27	Apr.	---	---	---	---
May	4.33	3.80	3.91	4.26	5.07	4.36	4.30	---	May	---	3.92	4.20	4.97	May	3.80	3.90	4.32	5.17	May	---	---	---	---
June	4.22	3.64	3.78	4.14	5.02	4.26	4.18	---	June	---	3.79	4.08	4.91	June	3.64	3.77	4.18	5.13	June	---	---	---	---
July	4.03	3.40	3.54	3.93	4.87	4.12	3.93	---	July	---	3.58	3.93	4.85	July	3.40	3.49	3.93	4.89	July	---	---	---	---
Aug.	4.09	3.48	3.61	3.99	4.91	4.18	3.99	---	Aug.	---	3.65	4.00	4.88	Aug.	3.48	3.57	3.98	4.93	Aug.	---	---	---	---
Sept.	4.09	3.49	3.68	4.01	4.84	4.17	4.00	---	Sept.	---	3.69	4.02	4.81	Sept.	3.49	3.66	4.00	4.87	Sept.	---	---	---	---
Oct.	3.97	3.47	3.63	3.90	4.58	4.05	3.89	---	Oct.	---	3.68	3.91	4.54	Oct.	3.47	3.58	3.89	4.62	Oct.	---	---	---	---
Nov.	3.92	3.50	3.57	3.87	4.51	3.95	3.88	---	Nov.	---	3.60	3.84	4.42	Nov.	3.50	3.54	3.89	4.60	Nov.	---	---	---	---
Dec.	4.05	3.65	3.70	3.98	4.63	4.10	3.99	---	Dec.	---	3.75	4.00	4.56	Dec.	3.65	3.65	3.96	4.70	Dec.	---	---	---	---
2013																							
Jan.	4.19	3.80	3.87	4.14	4.73	4.24	4.14	---	Jan.	---	3.90	4.15	4.66	Jan.	3.80	3.84	4.13	4.81	Jan.	---	---	---	---
Feb.	4.27	3.90	3.95	4.19	4.85	4.29	4.25	---	Feb.	---	3.95	4.18	4.74	Feb.	3.90	3.95	4.20	4.95	Feb.	---	---	---	---
Mar.	4.29	3.93	3.97	4.23	4.85	4.29	4.29	---	Mar.	---	3.95	4.20	4.72	Mar.	3.93	3.98	4.25	4.99	Mar.	---	---	---	---
Apr.	4.07	3.73	3.77	4.03	4.59	4.08	4.07	---	Apr.	---	3.74	4.00	4.49	Apr.	3.73	3.79	4.05	4.69	Apr.	---	---	---	---
May	4.23	3.89	3.94	4.19	4.73	4.24	4.22	---	May	---	3.91	4.17	4.65	May	3.89	3.97	4.20	4.80	May	---	---	---	---
June	4.63	4.27	4.32	4.56	5.19	4.63	4.63	---	June	---	4.27	4.53	5.08	June	4.27	4.36	4.58	5.29	June	---	---	---	---
July	4.76	4.34	4.46	4.69	5.32	4.78	4.74	---	July	---	4.44	4.68	5.21	July	4.34	4.47	4.69	5.43	July	---	---	---	---
Aug.	4.88	4.54	4.63	4.78	5.42	4.85	4.92	---	Aug.	---	4.53	4.73	5.28	Aug.	4.54	4.72	4.83	5.57	Aug.	---	---	---	---
Sept.	4.95	4.64	4.69	4.85	5.47	4.90	4.99	---	Sept.	---	4.58	4.80	5.31	Sept.	4.64	4.80	4.90	5.62	Sept.	---	---	---	---
Oct.	4.82	4.53	4.59	4.73	5.31	4.78	4.86	---	Oct.	---	4.48	4.70	5.17	Oct.	4.53	4.69	4.76	5.44	Oct.	---	---	---	---
Nov.	4.91	4.63	4.67	4.82	5.38	4.86	4.95	---	Nov.	---	4.56	4.77	5.24	Nov.	4.63	4.79	4.85	5.52	Nov.	---	---	---	---
Dec.	4.92	4.62	4.68	4.85	5.38	4.89	4.95	---	Dec.	---	4.59	4.81	5.25	Dec.	4.62	4.76	4.89	5.51	Dec.	---	---	---	---
2014																							
Jan.	4.76	4.49	4.53	4.69	5.19	4.72	4.78	---	Jan.	---	4.44	4.63	5.09	Jan.	4.49	4.62	4.74	5.29	Jan.	---	---	---	---
Feb.	4.68	4.45	4.46	4.60	5.10	4.64	4.71	---	Feb.	---	4.38	4.53	5.01	Feb.	4.45	4.54	4.66	5.19	Feb.	---	---	---	---
Mar.	4.65	4.38	4.44	4.56	5.06	4.63	4.65	---	Mar.	---	4.40	4.51	5.00	Mar.	4.38	4.49	4.60	5.13	Mar.	---	---	---	---
Apr.	4.52	4.24	4.33	4.45	4.90	4.52	4.51	---	Apr.	---	4.30	4.41	4.85	Apr.	4.24	4.36	4.48	4.96	Apr.	---	---	---	---
May	4.38	4.16	4.20	4.31	4.76	4.37	4.40	---	May	---	4.16	4.26	4.69	May	4.16	4.24	4.35	4.83	May	---	---	---	---
June	4.44	4.25	4.26	4.35	4.80	4.42	4.45	---	June	---	4.23	4.29	4.73	June	4.25	4.29	4.41	4.86	June	---	---	---	---
July	4.37	4.16	4.20	4.28	4.73	4.35	4.3																